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REPORT

OF

St. Louis Public Service Commission

TO

The Municipal Assembly of St. Louis

ON THE

Southwestern Telegraph and Telephone Company (Missouri)

FORMERLY

The Bell Telephone Company of Missouri

JAMES E. ALLISON
Chief Engineer

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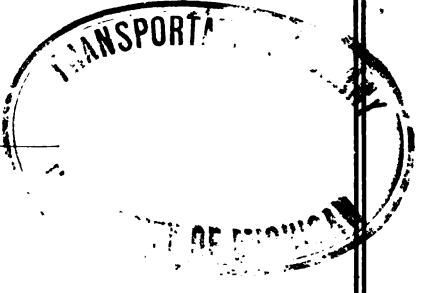

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REPORT

OF

St. Louis Public Service Commission

TO

The Municipal Assembly of St. Louis

ON THE

SOUTHWESTERN TELEGRAPH AND TELEPHONE COMPANY (Missouri)

Formerly THE BELL TELEPHONE COMPANY OF MISSOURI

ST. LOUIS, MO.,

To the Municipal Assembly of the City of St. Louis.

GENTLEMEN:—In compliance with the duties imposed by ordinance, and in obedience to the resolution heretofore passed by the City Council of the City of St. Louis requesting the Public Service Commission to make investigation of the quality of service rendered by the telephone companies in the City of St. Louis, and to make recommendations in reference thereto, this Commission undertook to make a complete investigation of the two telephone companies operating in this City, namely the Bell Telephone Company of Missouri and the Kinloch Telephone Company, the Companies being taken up for examination in the order above named.

In pursuance of the method heretofore adopted by the Commission in its examination of the public utilities in this City, it proceeded to have made a detailed inventory and appraisement of the property of the Bell Telephone Company for the purpose of determining the amount of capital invested and used in the service of the public upon which the Company is entitled to earn a reasonable return. After the Commission had proceeded in this work on the Bell Telephone Company to a point

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where members of its field force were available, it began to make an inventory of the property of the Kinloch Telephone Company.

While the Commission was thus engaged in its work on these Telephone Companies, and on March 17th, 1913, the Legislature of the State of Missouri passed a law creating a State Public Service Commission and granting to it, in addition to others, the powers theretofore possessed by municipalities in this State with reference to the regulation of public service corporations, their rates, service, etc., and repealing the law of May 8th, 1907, by virtue of which municipal corporations had the power to regulate public service corporations.

Inasmuch as after the enactment of this State law, this City no longer had the power to fix the rates of telephone companies operating in the City, this Commission recognized that it was useless for it to proceed further with its investigation of the telephone companies. But inasmuch as the inventory and appraisement made by it of the property of the Bell Telephone Company was then virtually completed and considerable expense had been incurred in this work, the Commission felt that it was only right that the results of this work should be reported to Your Honorable body, especially as such results might be of value to the City if at any time the matter of the regulation of telephone rates in this City should be presented to the State Public Service Commission for its consideration and determination.

The work done by the Commission in its examination of the Kinloch Telephone Company had not, at the date of the passage of the law creating the State Public Service Commission, proceeded so far as to justify this Commission in making a report on that Company.

This Commission therefore presents this report of its examination of the Bell Telephone Company of Missouri (now the Southwestern Telegraph and Telephone Co.), which includes an inventory and appraisement of the physical property of that Company in and contiguous to St. Louis, without any recommendations as to the proper rates to be charged by the Company, for the reason that such recommendations would be a futile act, inasmuch as the City no longer has the power to determine or fix the rates to be charged or the standard of service to be rendered by telephone or other public service companies in the City.

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HISTORY

As a preliminary to the report it may prove of interest to give a short history of the company and property. The following is taken from a sketch submitted by the Company:

BRIEF HISTORY OF THE SOUTHWESTERN TELEGRAPH AND TELEPHONE COMPANY (Missouri).

The telephone was introduced in Missouri in 1877 by The American District Telegraph Company of St. Louis. At first the public did not appreciate the possibilities of the telephone, and for this reason its early growth was rather slow.

The first Missouri telephone exchange was opened in St. Louis on May 1st, 1878. This exchange was equipped with switching apparatus, which made it possible to talk from any telephone to any other telephone connected with the exchange.

After considerable pioneer work had been done, the usefulness of the telephone for business and social purposes became fairly apparent to the general public and the business began to grow more rapidly. In order to keep abreast with the demands for service, it was necessary to obtain sufficient capital to install adequate equipment and extend the scope of business. Accordingly "The Bell Telephone Company of Missouri" was incorporated on Sept. 3, 1879, with a capital stock of $400,000. From that time to the present date, the growth of the Company is indicated by the attached statement showing number of stations, assets and liabilities, in five year periods, beginning December 31, 1879.

New exchanges were opened by the Company from time to time in various cities and towns throughout the easterly and northwesterly portions of the State. During the year 1882, the exchanges which had been established in western and northern Missouri were sold to the Missouri and Kansas Telephone Company and the field of operation of "The Bell Telephone Company of Missouri" was thereafter almost exclusively confined to St. Louis and vicinity. Improvements in the art, inventions and

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development of the business generally, made it necessary to rebuild the plant several times.

During the period from 1882 to 1910, the territory in which the Company operated remained practically unchanged. Since the latter date, however, the scope of the Company's business has been materially broadened by the purchase of telephone properties in cities and towns tributary to St. Louis, in the eastern part of the State.

The Company now operates 49 exchanges in the eastern half of Missouri and three exchanges in that part of Illinois immediately contiguous to St. Louis.

In March of this year the name of the Company was changed from "The Bell Telephone Company of Missouri" to "The Southwestern Telegraph and Telephone Company."

The following tabular statement is of interest as showing the growth of the business in St. Louis:

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THE SOUTHWESTERN TELEGRAPH AND TELEPHONE COMPANY (MISSOURI).

STATEMENT OF ASSETS AND LIABILITIES IN FIVE-YEAR PERIODS FROM 1879 TO 1912, INCLUSIVE.

YEAR	Stations	ASSETS			LIABILITIES			
		Plant	Misc'l Assets	Total	Capital Obligations	Current Liabilities	Reserve and Surplus	Total Liabilities
1879	527	$ 35,463	$ 414,269	$ 449,732	$ 400,000	$ 49,732	.....	$ 449,732
1884	1,437	193,752	262,418	456,170	400,000	35,122	$ 21,048	456,170
1889	2,867	260,502	253,386	513,888	400,000	47,665	66,223	513,888
1894	4,389	616,109	410,581	1,026,690	400,000	27,284	599,406	1,026,690
1899	5,751	1,876,689	346,232	2,222,921	1,505,500	109,895	607,526	2,222,921
1904	22,007	4,413,378	606,596	5,019,974	3,888,850	585,383	545,741	5,019,974
1909	49,732	8,925,909	752,361	9,678,270	8,898,000	304,075	476,195	9,678,270
1912	79,788	11,726,779	1,328,134	13,054,913	11,923,074	237,198	894,641	13,054,913

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TERRITORIAL LIMITS.

IN TELEPHONE RATE MAKING.

In dealing with the regulation of a property such as the one under consideration, it is extremely difficult to determine just where to draw the line limiting the property in the service of the community or district within which the rates or regulations are to apply.

The lines can seldom, if ever, be drawn to include only the property within the limits of a municipality, and frequently, as in this case, it is practically impossible to avoid including property lying beyond the boundary of the state.

In the regulation of telephone rates, this question, of the limits of the plant to be considered as the unit for rate making purposes, is sometimes of great importance owing to the fact that even at the same rates there will be a wide difference in net returns from different locations or territories, and these returns may not be at all in proportion to the investment of the company located in the particular territory under consideration; yet if the rates over the whole property are bringing the company only a reasonable return and we attempt to cut down the returns from those territories which bring more than that reasonable return, a situation is produced where the company must either abandon service and plant in certain territory, accept a return below the reasonable rate on the whole property or raise the rates in the unprofitable territory. The problem would, of course, be a very easy one if the last alternative were possible of adoption, but a raise of rates cannot, as a rule, be put into effect without reducing the volume of business and often bringing about a more unprofitable operation than exists under the original rate. This is especially true of certain toll lines and of the smaller towns and villages.

Assuming a reasonable return on the whole property, the problem at first sight might seem to resolve itself into the question of whether or not one local community shall or shall not bear a part of the burden of another local com-

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munity, but in reality it is not so simple of analysis, for the very nature of telephone service is in a sense to make one community out of several, and the subscriber or user in a productive locality has the use of the plant in the non-productive locality and is benefited at least to a degree by maintaining it. In other words, the use of a telephone plant is not entirely local and, therefore, the consumers from whom its support should come can not be localized completely. Just what degree of localization is proper in the adjustment of rates will vary with each particular case and necessarily presents a problem of considerable complexity.

At the time when this work was done by the Commission it expected to have the responsibility for the recommendation of rates and in order to have all the facts before it a valuation was made not only of the St. Louis and East St. Louis property but also of the outlying suburban property which might prove on investigation to be entitled to be included in the basis for rate making for St. Louis. After a study of the situation and in view of the rates being municipal rates the Commission concluded that a combination of the St. Louis and East St. Louis property, excluding all toll lines would form the proper basis for its recommendation. But whether or not a different and wider range might not be proper in regulation by a State-wide rate-making body is a question open to discussion and the solution of the problem belongs to the State Public Service Commission.

The valuation of the St. Louis and East St. Louis (physical) property is shown in Tables 1 to 5, and the construction costs and land values of the suburban property is given in another part of the report.

THEORY OF VALUATION.

The valuation work of the Commission in this case (except as to land) has been based as far as was possible upon the original cost of the items of equipment now in the service of the public, and it is agreed with the engineers of the company that so far as direct cost of construction is concerned there would be little difference in result whether original cost or cost to reproduce new is used.

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The experience and study of this Commission convinces it that a "fair value," i. e., an amount satisfying to the sense of justice and better called a Just Amount, is difficult to attain by strictly following throughout any one theory of valuation, but it believes that so far as items other than land are concerned, the original cost theory offers many advantages both to the investor and to the consumer. In the first place it offers stability; the investors who have placed say a million dollars in a public utility enterprise have some assurance (depreciation excepted) that they are to be allowed to continue to earn on a million dollars, provided the investment is made in good faith and with reasonable judgment, and the property kept up. All risk of loss in value from fluctuations in the price of labor and material is removed. It is true that all chance of gain from the same fluctuations is also removed. But generally speaking, capital, especially large capital, would much prefer safety to chance of gain at the expense of safety. If this is granted, it follows that the *consumer also would benefit* by the low return at which capital could be secured.

At present we are going through a period of re-adjustment of values in public utility properties on account of the presence or imminence of public valuation, and this period necessarily brings much uncertainty as to investments in public service properties. Yet the true aim of regulation is to bring about, eventually, a condition where, so far as possible, all risk and all speculation will be removed from the enterprise, and there will be a clear, lasting and dependable understanding between the consuming public and the investing public. Such a desirable condition can be attained only by making it understood that investors are to be allowed returns upon what they properly invest and keep invested in the service of the public, and not by making their property the subject of future fluctuation in prices of labor and materials over which they can exert no control.

When *separated from the earning power of the plant* as a whole, by far the greater part of the equipment of a Public Utility can be said to have no measurable value other than a scrap or second hand value and as this earning power is the object of inquiry in a rate case, the so-called valuation of a Public Utility equipment is in fact the determination of what the value should be rather than the ascertainment of a value already existing, i. e., we say what amount shall earn returns

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and thus establish that amount as the future value (provided the rate of return is properly established). The methods of establishing this value are in a sense arbitrary and consist in simply totalizing the costs of the separate items. The costs used may be actual original costs of the existing equipment or they may be the present costs of similar items, or the costs may be made up from averages. The totalized costs may or may not be depreciated to obtain the final figure.

Whether the investor should earn on a basis of the actual cost of the present equipment or on what it would cost today or on a figure made up from averages is a question which might bring different answers according as each method appeals to the sense of justice of the reasoner. In practical work there will generally be found to be a remarkably small difference in results whichever method is used when the property under consideration is a Utility composed of short life equipment, i. e., Railroads, Street Railroads, Steam-Electric and Telephone properties. With Gas and Water Works properties there might be a considerable difference in results and as time goes on the Hydro-Electric properties also may show differences.

Admitting that the so-called valuation of equipment in rate cases is not really a process of finding an existing value but merely a method of establishing a Just Amount to be earned on and that any of the several methods might appeal to a sincere desire to attain a just result, it cannot be denied that for the sake of clear knowledge of what is to be expected from the future and for the elimination of unnecessary risks to capital arising from Public Regulation the Original Cost method is the best in giving the Investor the assurance that what he puts into the Public Service shall be used as the basis of his future returns. It is for this reason among others that this Commission believes the Original Cost method to be the preferable one to use in the valuation of equipment where there is not some circumstance clearly indicating that the use of the method would bring about an unjust result.

VALUATION OF LAND.

It has been stated above that the greater part of equipment has no measurable present "value" (other than scrap or second hand) separable from the earning power of the whole plant, but

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with land the case is entirely different. Land generally has a present value distinct from its use in a Public Utility. This value is what it might be expected to bring at a sale under ordinary conditions and will approximate the value of contiguous property.*

In fact "Commercial Land" (See note) is almost a cash item at its present sale value. The company could supposedly realize this amount in money but refraining from doing so and keeping the amount in the service of the Public, it seems but just that this present value should be the amount upon which it should be allowed to earn reasonable returns. The Commission believes that the value assigned to Commercial Land in this case should be its appraised present value in the market and has used this appraised value in building up the amount upon which it considers this company entitled to earn a reasonable return from the Public.

INVENTORY AND DIRECT COSTS.

A short description is here given of the methods used by the Commission's engineers in making inventory and applying direct costs of construction for the St. Louis and East St. Louis plants.

In dealing with some of the smaller plants in outlying portions of the property somewhat different methods were sometimes used in the details of the work to suit the particular case in hand.

TOLL SERVICE AND NON-TOLL SERVICE.

All toll service equipment was segregated from St. Louis and East St. Louis inventory and no difficulty was experienced in doing this, except in Bomont and East St. Louis Exchanges where a separate distributing estimate might be desirable, before rates are determined. In the case of Bomont Exchange, the generators, power switchboard, ventilators, kitchen, rest room, etc., serve both toll and non-toll and the telegraph equipment. The largest item, however, is in the building. Sketches

*NOTE.—This statement must be qualified considerably in the case of Railroad right of way, but discussion of the point is not germane to the present case, as the Land of the Company is probably all "Commercial Land," having value for other uses than the present one.

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were made of the floor space occupied by each class of service from which it may be possible to apportion the value of the building on a square foot basis. Another Exchange listed in which there is more than one class of service is East St. Louis. Here the plant is divided according to service into "Bridge" and "East." All "Bridge" numbers enjoy St. Louis connection without an additional charge over their contract rate while for "East" numbers an extra charge of five cents above the contract rate is made for each St. Louis connection. In other words "East" has the same service regarding St. Louis connections as Webster and Kirkwood. The classification of service is mentioned here for record in order that a distribution may be made later, if necessary. A distribution might be made on the basis of the stations served in each class. At the date of this inventory "East" serves 1136 stations and "Bridge" serves 1696 stations, including P. B. X. (Private Branch Exchange) stations. All calls originating in St. Louis for East St. Louis have no extra charge attached, and from this point of view there would be no need for a division of the Exchange. The determination of this question can only be decided in connection with the adjustment of the new rates.

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CLASSIFICATION OF TELEPHONE PLANT AS INVENTORIED BY PUBLIC SERVICE COMMISSION.

- **Wire Plant**
  - **Aerial**
    - 1—Poles
      - Cross Arms
      - Guys
      - Brackets
    - 2—Terminals
    - 3—Cable & Messenger Wire
    - 4—Drops
    - 5—Open Wire
  - **Under Ground**
    - 1—Conduit
      - 1—Ducts
      - 2—Manholes
      - 3—Laterals
      - 4—Racks
    - 2—Cable
      - 1—Main
      - 2—Laterals
  - **House Cable**
    - 1—Main runs
    - 2—Terminals
    - 3—House wire or drops included in telephone installation
- **Exchanges & Station Equipment**
  - **Central Office.**
    - 1—Switch Boards
    - 2—Cable
    - 3—Frames
    - 4—Machinery
    - 5—Batteries
    - 6—Fixtures
    - 7—Training School
    - 8—Kitchen, Rest Room
  - **P. B. X.**
    - 1—Switch Boards
    - 2—Station Phones
    - 3—Cable from C. C. Frame to Switch Board
    - 4—Battery
    - 5—Charging Set
  - **Subscribers' Stations**
    - 1—Telephones
    - 2—Coin Boxes
    - 3—Protectors
    - 4—Booths & Fittings
    - 5—Miscellaneous private lines
- **Buildings**
- **Land**
- **Right of Way**
- **Furniture and Fixtures**
- **Tools and Vehicles**

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For inventory purposes the property was classified as shown in the classification table on page 12. It is seen from this table that the whole plant was first classified under four heads, viz.: Wire Plant, Exchange and Station Equipment, Buildings, and Land. In the case of the first two classes the plant was further subdivided as shown. The following is a very brief description of the methods pursued in making inventory and applying costs.

WIRE PLANT.

AERIAL.

POLES.

Poles were inspected, listed and classified in the field and complete maps made showing location. All Cross Arms, Guys and Brackets were taken with the poles and shown in detail on the field sheets. From this detailed inventory the costs were made up by applying the prices actually paid for poles as shown by the books of the company adding to them allowances for hauling, yard expense, material and labor for setting, supervision, etc., etc.

TERMINALS.

Terminals were inspected and listed at the same time as the overhead cable and estimated Unit Costs applied. These estimated costs being checked from the Company's records.

CABLE AND MESSENGER WIRE.

Cable and Messenger wire were inspected and a complete field inventory made. It was then priced in detail from records of purchases made by the company. Vouchers for 85.7% of the whole amount in service gave actual cost of the cable and the installation costs were estimated to correspond to actual costs at the time of installation.

DROPS.

It was impractical in a plant of this size to inspect and count the drops in detail. The Engineers of the Commission therefore made an estimate of the number from the number of connections or individual stations and applied estimated Unit Costs of material and installation.

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OPEN WIRE.

The amount of wire in overhead districts was one of the most difficult items to obtain accurately. The Commission's estimate was made entirely from field data obtained by the pole inspectors, and checks very closely with the estimate of the company. The Unit Prices for open wire were made from summary of vouchers with an estimated installation cost added. The fact that a large part of this wire is put up "piece meal" was considered, and allowance for same included in the cost of installation.

UNDERGROUND SYSTEM.

In making an inventory of the Underground system the Commission first had diagrams of each manhole made from the working records of the company. Each diagram shows the number of ducts recorded as leading into the manholes and location and size of cable in the ducts. These diagrams were then given to the inspectors of the Commission to check by inspection in the field. Where errors were found in the records they were corrected to correspond to the facts. From the corrected diagrams together with the known distances between manholes the quantity estimates of ducts and cables were made up and to these quantity estimates were applied Unit Prices made up from records of cost obtained from the vouchers and estimates of cost of installation as of the time when the different portions of the system were built. Costs of the manholes themselves are estimated or derived from records. The charges for racking were included in installation costs together with wastage, store charges, supervision, etc., etc.

HOUSE CABLE.

Inventories of house cable were taken from records of the company and a percentage checked to establish the accuracy of the records. The small amount of investment in this class of property did not warrant the heavy expense to be incurred in a detailed inventory. To the checked quantity estimate was applied the Unit Prices as established by the Engineers of the Commission.

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EXCHANGE AND STATION EQUIPMENT.

CENTRAL OFFICE EQUIPMENT.

Referring to classification sheet, attached, it will be noted that Central Office, or Exchange, equipment is divided under eight headings: Switchboards, Cable, Frames, Machinery, Batteries, Fixtures, Training School, Kitchen, Rest Room and Miscellaneous. With this classification in view a detailed field inventory was made of each plant, and a final summary sheet shows the total according to Exchanges. The field sheets show quantities of Physical plant according to manufacturer's code stamped in the apparatus in most cases. The Company furnished a man to check quantities and code of apparatus listed by the Commission's engineers. The field data, therefore, represents a check inventory as to quantities and code.

UNIT PRICES.

The unit prices used were obtained from contracts and in a large measure apply to the actual contracts for the apparatus by units as it exists today. Due to additions to sections and equipment it was impossible to apply the lump sum contract to any installation. By comparing the unit prices on relays, jacks, keys, etc., over the period 1902 to 1912 it was found that the unit prices were uniform for the coded apparatus. In the pricing of the "Forest" Exchange, on which there was the least data, units were largely used from "Lindell" contracts. Installation costs of Exchange Equipment, includes all labor and overtime for placing complete exchanges on large installations, including storage batteries, machines, switchboards, section lighting system, wire and conduit; also, installation material such as webbing, alcohol, paint, miscellaneous iron and lumber, lockstitch, screws, manson tape; also, freight, meals, car fare, berths, etc.

As a part of the exchange equipment was installed in small quantities, such as adding additional multiples, answering jacks, distributing frames, coil racks, cable, etc., which cost more to install than the regular first installation, the bills from 1903 to 1910 were thoroughly inspected and a summary made

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of such items as were considered to come under additions to plant, or "piece meal" installation other than maintenance; an extra percentage allowance was made for such installation.

PRIVATE BRANCH EXCHANGE EQUIPMENT.

The Private Branch Exchanges were inventoried in detail by the Commission, together with all auxiliary apparatus, telephones, etc. It was found advisable to separate the regular Nos. 101-102-4 Exchanges from the No. 2 semi-automatic Exchanges. This was done and the No. 2 semi-automatic, with telephones, keys, cable, etc., are inventoried separately and priced in detail. The unit price for P. B. X. equipment was obtained from bills, and installation of same was estimated.

SUBSCRIBERS' STATIONS.

It was manifestly impractical to inventory the subscribers' stations by household visits to each so the subscribers' telephone stations were obtained from the Wire Chief Records, with the apparatus coded and auxiliary apparatus listed. Men familiar with apparatus were detailed to tabulate the data from the cards. The data was then inspected by the Commission's Engineers and an expert from the Company and where there was apparent discrepancies in complete sets the missing apparatus was added and corrections made for errors in copying the thousands of cards involved.

The number of stations were also checked with the telephone directory and with the auditor's records. This checking and cross checking produced a result whose approximate accuracy cannot well be questioned.

The Unit Prices used for subscribers' stations were obtained from the vouchers and priced in detail according to the code of the apparatus. Cost of installation was estimated as of the time of installation.

"PIECE MEAL" INSTALLATION.

In all cases where it was evident that equipment was installed "piece meal" due allowance was made for such condition.

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BUILDINGS.

In determining the cost of buildings the Commission found in most cases contracts covering the cost of erection which with inspection of the building were conclusive evidence as to original cost. Where alteration or addition had been made an estimate of such costs were taken into consideration. Where there were no contracts the buildings were estimated from engineering cost data and adjusted to correspond with the time of erection.

LAND.

In this case as in its valuations of the property of other public utility corporations the Commission instructed its expert valuators, Mr. Albert T. Terry and Mr. Robt. Rutledge, to value the Land as at its present market value not considering value for special use to the present holder.

In its valuations of other companies the Commission was vigorously opposed in this theory of valuation by the Companies, but in this case the company adopted the same theory and as a consequence the differences between the company and the Commission's experts in the valuation of Land are negligible. Since this work was done the method of valuing Land adopted by the Commission has been upheld by the decision of the United States Supreme Court in the Minnesota Rate Case.

RIGHT OF WAY.

Right of way in this case means to a great extent the investment caused by the necessary payments to land owners for the privilege of erecting poles upon private property or in some cases payment for location of poles in the public street in such position as to cause complaint from the adjacent property owners. There is also included in this item of investment such costs as the legal fees to city and county for pole or wire permits and the executive and clerical expense necessary to locating and obtaining the right to set poles and string wire.

In estimating the investment in this item the records of the company were taken into consideration and these together with the opinion of the Commission as to the reasonable cost of such investment determined the amount allowed.

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FURNITURE AND FIXTURES.

A complete detail inventory and appraisal was made of this item with the result as shown in the tables. Furniture in storage of which there was a considerable amount was not included in the valuation.

TOOLS AND VEHICLES.

This item includes all necessary tools for maintenance, construction, etc., and all horses, mules, wagons, carts and automobiles belonging to the company. A complete inventory and appraisal was made of this species of property with the result that the Commission's appraisal ran slightly higher than the figures presented by the company but as the Commission's appraisal was made subsequent to the assumed date of appraisal it was decided to adopt the figure presented by the company on this item as being correct for the assumed date, the difference between the two amounts being negligible.

ASSUMED DATE OF INVENTORY.

In making a detailed inventory for property as large as the one under consideration here, it is customary for purposes of record to assume a Date of Inventory. In this case the Commission has assumed June 30, 1912, as the date of Inventory.

It is not, of course, claimed that the whole inventory is actually of that date, but adjustments were made to the end that the property considered should be as closely as possible as if inventoried on the date assumed.

SECONDARY CONSTRUCTION COSTS.

The Secondary Construction Costs as here classified consist of engineering, interest during Construction, insurance during Construction, and taxes during Construction. The Company has also made a claim (see table 36) for $184,984.00 under the head of "General Expense" but this item the Commission did not allow, considering that such expense had been amply covered by the allowances made in the application of Contingency percentages in the details of the valuation.

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ENGINEERING.

Under the head of Engineering the Commission made the customary allowance of 5% on the direct Cost of Construction.

Engineering, 5% on $8,462,537.00, $423,127.00.

INTEREST DURING CONSTRUCTION.

An allowance for Interest during Construction is made in public Valuation work to cover the lack of return upon capital during the period from the time it is invested in the construction of the plant to the time when the plant comes into operation and it becomes possible to earn a return. It is a proper construction charge, for the investor surely places in the plant the earnings which his capital might have made if otherwise employed during the period of construction.

It has been customary to calculate the charge at a rate (generally 6%) at which money could be borrowed on good security. This Commission, however, believes that as soon as money is invested in the plant of a Public Utility it partakes of all the risks of the business and that therefore Interest during construction should be calculated upon the same per cent as is allowed as a reasonable return upon the whole utility. In this case, on account of the fact that in St. Louis the Telephone business is decidedly competitive and therefore hazardous, the rate of reasonable return should in the judgment of the Commission not be placed below 8%.

Table 21 gives the Commission's estimate of the just allowance for Interest During Construction in this case. The column headed Mean Time indicates the time in months during which in the judgment of the Commission, the investment in each class of equipment should be allowed interest for capital lying idle during construction. An investment in construction is not generally made all in one payment at the beginning of the work but the payments are divided more or less evenly over the period of construction. The time factor used here as the basis of calculation is the "Mean time" or one-half the full time estimated for the average period of construction of the class of equipment under consideration.

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TAXES DURING CONSTRUCTION.

Table 20 gives the Commission's allowance for the item of Taxes During Construction. This allowance is to cover the expenditures of the company for Taxes during the period between the beginning of the installation and the coming in to operation of the part of the plant under consideration. It is a proper construction charge, as the money must be expended from capital or earnings not attributable to the plant under construction. The Mean Time used is the same as in the calculation of Interest During Construction and the Taxes are at the rate of 2.2% on 60% of the Cost.

INSURANCE DURING CONSTRUCTION.

Table 19 gives the Commission's allowance for Insurance During Construction, the same reasons for making the allowance apply as in the case of Taxes but the allowance is made only on such items as would be likely to call for Fire Insurance. The calculation is made on a basis of 1.5% on 80% of the Costs.

NOTE.—Liability Insurance During Construction is in this case covered by Contingency allowance and by the inclusion of risk in the rate allowed for interest during construction.

DEPRECIATION.

In its report on the property of the United Railways Company this Commission took the position that in a rate or regulation case the investment in the service of the public should not be depreciated on account of age so long as the service rendered is from a property equal to or above its normal and only possible permanent state. The main reasons for this position are set out in a sub-report of former Commissioner Allison published as an appendix to the United Railways Report. The same sub-report is republished with some slight alterations as Appendix D to this report and the Commission takes the same position in regard to depreciation in this case.

The fallacy of depreciating from cost (either original or reproduction) in such a manner as to assure reasonable returns on a so-called value calculated only on the estimated remainder of life of equipment seems to be based upon a confused idea that an "exchange or sale value" is attainable on equipment in a

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rate case. As has been stated in other parts of this report the "exchange or sale value" of equipment (except scrap or second-hand value) when once installed depends upon and is inseparable from the earning power. The regulation of the earning power is the object of the investigation and therefore the exchange or sale value of the equipment as a whole cannot be known until the proper earnings are determined.

The aim of regulation should be protection of the consumer and just treatment of the investor. If the investors have placed a certain amount of money in an equipment in the service of the public and are maintaining and are obliged to maintain said equipment at the highest efficiency and are renewing all worn or obsolete parts as soon as they become unfit for service it would seem that they are performing their full duty to the public and should be allowed to earn returns on the amount invested in the public service for the equipment in the service of the public unless it can be shown conclusively that the public have paid them back a part of their investment in the shape of clearly defined depreciation charges. Where there has been no regulation in the past and where it can be shown that there was no necessity of establishing a depreciation fund equal to the consumption of estimated life of each item of equipment (see Appendix D, page 122), deduction for theoretical depreciation in a rate case involving a large "piece meal" built property in a normal and efficient state becomes in fact merely a confiscation of past profits.

It is shown in Appendix D that after attaining its normal state a large utility will need its full depreciation charges which theoretically at least will not remain long unused, on account of the constant and steady demand for renewals. Depreciation on account of the element of obsolescence is a somewhat unknowable quantity and it will probably prove good policy to allow a certain amount to accumulate in the depreciation fund to take care of the unforeseen, but in a large property it can hardly be contended that this fund should equal the composite difference between 100 per cent and the estimated composite remainder of life.

It should be well understood however that where a stated depreciation charge is established by law or legal regulation and where such charge accumulates, the amount of this accumulation

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(the depreciation reserve fund), should be treated as in a sense the property of the consumer. It may be permitted that the company use the fund in certain ways but it should not be treated as a part of the capital of the company. In fact the depreciation charge is paid by the consumer for a specific purpose, i. e., to keep the property intact and efficient. When not in use for that purpose it is a trust fund handled for the public by the company.

This reasoning however does not apply to the past where there was no need for a fund and no well defined legal limits to profit. (See Appendix D.)

COST TO ESTABLISH THE BUSINESS.

The Company has submitted to the Commission an argument for the item of Cost to Establish the Business which is printed in the report as Exhibit I, Appendix A. The claims as submitted are:

Organization and Development.....	$ 295,000.00
Selling Service	234,000.00
Interest and Operating Expenses During Development	1,148,000.00
Total Cost to Establish Business....	$1,677,000.00

As presented in Appendix A these claims seem to be based partly upon an estimate of actual expenditure or original cost and partly upon an estimate of hypothetical expenditure in the imaginary reproduction of the plant as it stands today during an estimated present construction period of four years.

It can hardly be doubted that the company is entitled to an allowance for the item of Cost to Establish the Business but the Commission does not agree entirely with the method or theory upon which the estimate is built up in Appendix A.

A thorough investigation of the subject of Cost to Establish the Business in this case would involve a research into the books of the Company back to the year 1879. Such an investigation would involve a considerable expense for expert accountants which expenditure the Commission considers as unwarranted in view of the fact that the City no longer has any power over the rates.

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Summary of Valuation of Physical Property of St. Louis and East St. Louis Plants

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TABLE No. 1.

SUMMARY OF PHYSICAL PROPERTY.

St. Louis and East St. Louis Plant.

	Class of Plant—	
1.	Land	$ 494,200.00
2.	Building	645,886.00
3.	C. O. Equipment	1,475,144.00
4.	Subscribers' Station Equipment	676,430.00
5.	P. B. X. Switchboards	272,860.00
6.	Booths	6,982.00
7.	Poles	708,618.00
8.	Aerial Cable	1,178,086.00
9.	Aerial Wire	284,982.00
10.	Drop Wire	190,745.00
11.	1 Pr. Lead Cable	26,775.00
12.	U. G. Conduit	957,207.00
13.	U. G. Cable	1,427,253.00
14.	Terminals	86,769.00
15.	Right-of-Way	30,600.00
16.	Furniture and Fixtures	35,907.00
17.	Tools and Vehicles	76,830.00
18.	Engineering	423,127.00
19.	Insurance During Construction	18,077.00
20.	Taxes During Construction	78,989.00
21.	Interest During Construction	531,971.00
22.	Working Capital—Supplies	169,200.00
23.	Working Capital—Cash	368,000.00
	Total	$10,164,638.00

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TABLE No. 2.

SUMMARY OF DIRECT CONSTRUCTION COSTS.

Direct Cost of Physical Property St. Louis and East St. Louis Plant.

Class of Plant—	Total Amount Inc. Supervision and Omissions and Contingencies.
Land	$ 494,200.00
Building	645,886.00
C. O. Equipment	1,475,144.00
Subscribers' Station Equipment	676,430.00
P. B. X. Switchboards	272,860.00
Booths	6,982.00
Poles	708,618.00
Aerial Cable	1,178,086.00
Aerial Wire	284,982.00
Drop Wire	190,745.00
1 Pr. Lead Cable	26,775.00
U. G. Conduit	957,207.00
U. G. Cable	1,427,253.00
Terminals	86,769.00
Right-of-way	30,600.00
Furniture and Fixtures	35,907.00
Tools and Vehicles	76,830.00
Total	$8,575,274.00

TABLE No. 3.

SUMMARY OF SECONDARY CONSTRUCTION COSTS AND WORKING CAPITAL.

St. Louis and East St. Louis Plants.

Engineering	$ 423,127.00
Insurance during Construction	18,077.00
Taxes during Construction	78,989.00
Interest during Construction	531,971.00
Working Capital—Supplies	169,200.00
Working Capital—Cash	368,000.00
Total	$1,589,364.00

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LIST OF ST. LOUIS AND EAST ST. LOUIS EXCHANGES.

Benton Exchange.
Bomont Exchange.
Cabany Exchange.
Forest Exchange.
Monroe Exchange.
Grand Exchange.
Lindell Exchange.
Main Exchange.
Olive Exchange.
Sidney Exchange.
South Exchange.
Tyler Exchange.
East St. Louis Exchange (including Bridge and East).

TABLE No. 4.

LAND.

(Item 1, Table No. 1.)

Land—	Commissions' Appraisal.
Benton Exchange—Rented land.	
Bomont Exchange—C. B., 928 Cor. Beaumont and Locust..	$ 8,000.00
Cabany Exchange—C. B., 5408 Delmar Ave.....	6,000.00
Forest Exchange—C. B., 5051A Delmar Ave.....	5,000.00
Monroe Exchange—C. B., 5051A Delmar Ave. (Inc. in Forest)	.....
Grand Exchange—C. B., 2123 McRee & Grand Ave.....	4,500.00
Lindell Exchange—C. B., 3926 Olive St.....	12,500.00
Main Exchange—C. B., 274 10th and Olive St.....	150,000.00
Olive Exchange—C. B., 274 10th and Olive St. (Inc. in Main)	.....
Sidney Exchange—C. B., 793 11th and Sidney St.....	2,400.00
South Exchange—C. B., 3001 Minnesota Ave.....	500.00
Tyler Exchange—C. B., 349 Chambers St.....	2,000.00
East St. Louis Exchange—C. B., 47 8th and Missouri Ave...	15,000.00
Euclid Exchange—C. B., 5260 St. Louis Ave.....	6,300.00
Tenth and Pine Exchange—C. B., 274	275,000.00
Residence—C. B., 928 Locust St.....	7,000.00
Total.....	$494,200.00

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Intermediate Tables

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INTERMEDIATE TABLES.

These tables are the connecting link between the Detail Inventory sheets, the Extension sheets and the figures finally used in the Summary Tables.

The publication of the Detail and Extension sheets in full is considered impractical as they would occupy many volumes and entail a very large expense.

In studying these Intermediate Tables it should be held in mind that allowances for Contingencies, etc., have in many instances been made in the calculation of Unit Prices. The allowances shown in the Intermediate Tables are often in the nature of extra allowances, based upon judgment of circumstances, investigated after the Unit Prices were applied.

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TABLE No. 5.

INTERMEDIATE.

Buildings.

(Item 2, Table No. 1.)

	Commissions' Appraisal.
Benton Exchange—Rented building.	
Bomont Exchange	$ 45,680.66
Cabany Exchange	39,471.17
Forest Exchange	42,855.79
Monroe Exchange—In same building as Forest.	
Grand Exchange	22,743.77
Lindell Exchange	64,095.52
Main Exchange	197,635.85
Olive Exchange—In same building as Main.	
Sidney Exchange	9,791.29
South Exchange	3,442.93
Tyler Exchange	29,925.28
East St. Louis Exchange (Including Bridge and East)	68,786.39
Euclid Exchange—Not in service	47,337.11
Pole Yard	30,567.53
Sidney Stable	691.11
Store Room, 919-921 Pine St.	6,641.62
New Palatine Hotel, 10th and Pine St.	17,146.47
Other Building, 10th and Pine St.	5,741.06
Residence, Locust and Beaumont	13,332,80
Total	$645,886.35

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TABLE No. 6.

INTERMEDIATE.

Central Office Equipment.

(Item 3, Table No. 1.)

P. S. C. Estimate Labor and Material (as of Jan 1, 1912)	$1,293,215.00	
Supervision (Apx. 2%)	28,944.00	
Store Expense (Apx. 1%)	13,329.00	
Addition to Plant and Misc. Allowances	107,325.00	
	$1,442,813.00	
Contingencies	32,331.00	
Total		$1,475,144.00

A contingency was allowed on material and labor of 2½% for piece meal construction, and amounts to approximately 2¼% on the total.

NOTE.—The additions to plant subsequent to P. S. C. inventory is an adjustment, making the inventory as of June 1, 1912; this includes an item of $53,126.00, for additional exchange equipment at the Cabany Exchange.

TABLE No. 7.

INTERMEDIATE.

Stations.

(Item 4, Table No. 1.)

Station Apparatus	$ 305,383.00	
Addition to Plant	13,225.00	
Induction Coils @ 35c—57,110 Sta.	19,989.00	
Total Station Apparatus	$ 338,547.00	
Supply Expense 15%	50,782.00	
*Installation 57,110 at $4.22	241,004.00	
	$ 630,333.00	
Contingency 5%	31,517.00	
Total	$ 661,850.00	
Addition to Plant Inc. Contingency	14,580.00	
Total	$ 676,430.00	

*NOTE.—In Installation $20,560.00 supervision is included or .36 on 57,110 stations.

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TABLE No. 8.

INTERMEDIATE.

Private Branch Exchanges.

(Item 5, Table No. 1.)

P. S. C. Material Field Inventory.....	$ 171,295.00	
No. 2 P. B. X. Material Field Inventory.....	12,000.00	
Miscellaneous Additions Material	10,000.00	
	$ 193,295.00	
Store Expense 5%	9,665.00	
Installation	$ 202,960.00	
Miscellaneous Omissions	33,003.00	
Piece Meal Installation, Overtime, etc.....	12,000.00	
Installation of No. 2 Exchanges.....	9,450.00	
Installation for Miscellaneous Material....	1,297.00	
	$ 258,710.00	
Sup. 16% to Labor $55,000.00.....	8,800.00	
	$ 267,510.00	
Add 2% Contingencies	5,350.20	
Total.....		$272,860.20

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TABLE No. 9.

INTERMEDIATE.

Booths and Special Fittings.

(Item 6, Table No. 1.)

P. S. C. Field Inventory	$ 6,022.00	
Supply Expense	200.00	
	$ 6,222.00	
Supervision 2%	125.00	
	$ 6,347.00	
Contingencies 10%	634.70	
Total		$ 6,981.70

TABLE No. 10.

INTERMEDIATE.

Poles.

(Item 7, Table No. 1.)

Poles, P. S. C. Field Inventory	$ 492,631.75	
Fittings, P. S. C. Field Inventory	144,794.05	
	$ 636,825.00	
Allowance for Better Poles in City*	13,891.75	
Additional Freight	4,500.00	
	$ 655,217.55	
Supervision 3%	19,656.45	
	$ 674,874.00	
Contingency 5%	33,743.70	
Total	$ 708,617.70	

*NOTE.—The unit costs of poles were arrived at by taking into consideration vouchers for all poles purchased. An extra allowance was made for city poles, on account of the fact that those of superior quality were selected for city use.

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TABLE No. 11.

INTERMEDIATE.

Aerial Cable.

(Item 8, Table No. 1.)

P. S. C. Field Inventory	$ 901,260.40
Removed from Plant (Bell Fig.)	10,998.40
	$ 890,262.00
Extra Transferred from Terminals	46,072.00
Extra for Original Cost @ 2 cents per ft. Apx.	50,000.00
Extra for Freight about 1.5%	5,000.00
	$ 991,334.00
Extra for Supervision 4%	39,653.36
Store Expense 5% on $800,000	40,000.00
	$1,070,987.36
Contingency 10%	107,098.74
Total	$1,178,086.10

TABLE No. 12.

INTERMEDIATE.

Aerial Wire.

(Item 9, Table No. 1.)

Material	$ 145,291.50
Store	14,587.50
Team	17,505.00
Supervision	11,670.00
Labor	70,020.00
Aerial Wire	$ 259,074.00
Contingency 5%	12,954.00
	$ 272,028.00
Add 5% for Piece Meal Installation	12,954.00
Total	$ 284,982.00

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TABLE No. 13.

INTERMEDIATE.

Drop Wire.

(Item 10, Table No. 1.)

No. 17—Copper Clad Drops	$ 37,735.50	
No. 14—Copper Drops	134,965.20	
Supervision	8,961.30	
	$ 181,662.00	
Contingency 5%	9,083.00	
Total		$ 190,745.00

TABLE No. 14.

INTERMEDIATE.

1 Pair Lead Cable.

(Item 11, Table No. 1.)

Material	$ 8,466.00	
Store Expense	1,258.00	
Supervision	2,176.00	
Labor	13,600.00	
Total	$ 25,500.00	
Contingencies 5%	1,275.00	
Total		$ 26,775.00

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TABLE No. 15.

INTERMEDIATE.

Underground Conduit.

(Item 12, Table No. 1.)

P. S. C. Field Inventory	$ 746,056.00	
Added since Inventory	2,761.00	
	$ 748,817.00	
Supervision 3%	22,465.00	
	$ 771,282.00	
Contingency 8%	61,702.00	
	$ 832,984.00	
Laterals	124,223.00	
		$ 957,207.00

NOTE:—

Total Contingencies.—Conduit	$ 61,702.00	
Laterals	5,906.00	
	$ 67,608.00	
Total Supervision—Conduits	22,465.00	
Laterals	3,608.00	
Total	$ 26,073.00	

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TABLE No. 16.

INTERMEDIATE.

Underground Cable.

(Item 13, Table No. 1.)

P. S. C. Field Inventory	$1,089,014.00	
Additions to Plant	93,764.00	
Extra for Splicing Terminals	3,780.00	
Extra for Original Cost 1c per ft. Apx.	12,000.00	
Extra for Freight	5,000.00	
	$1,203,558.00	
Supervision 2%	24,072.00	
	$1,227,630.00	
5% Store Expense $1,000,000.00	50,000.00	
	$1,277,630.00	
House Cable Inc. Store Room Charge	33,067.00	
Loading Coils Inc. Store Room Charge	48,592.00	
	$1,359,289.00	
Contingency 5%	67,964.00	
Total		$1,427,253.00

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TABLE No. 17.

INTERMEDIATE.

Terminals.

(Item 14, Table No. 1.)

Underground—		
Fuse Boxes	$ 22,611.00	
Pot Heads	3,661.00	
Cross Connecting Boxes	13,186.00	
Protected Block Terminals	4,440.00	
House and Building Terminals	8,583.00	
Total		$ 52,481.00
Aerial (Not Protected)	$ 19,794.00	
Aerial (Protected)	11,157.00	30,951.00
Total		83,432.00
4% Omissions and Contingencies		3,337.00
Total		$ 86,769.00

TABLE No. 18.

INTERMEDIATE.

Terminals.

(Item 14, Table No. 1.)

Underground	$ 52,481.00	
Aerial	30,951.00	
	$ 83,432.00	
4% Omissions and Cont.	3,337.00	
Total		$ 86,769.00

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TABLE No. 19.

INTERMEDIATE.

P. S. C. ESTIMATE INSURANCE DURING CONSTRUCTION.

St. Louis and East St. Louis Plants.

(Item 19, Table No. 1.)

Class of Plant.	Total Cost Including Omissions and Contingencies.	Mean Time During Construction Months.	Insurance 1.5% Per Annum on 80% Valuation. Amount.
Real Estate—			
Land	$ 494,200.00	24	$.....
Buildings	645,886.00	12	7,751.00
Total R. E.	$1,140,086.00		$ 7,751.00
Equipment—			
C. O. Equip.	1,475,144.00	7	10,326.00
Station Apparatus and Installation	676,430.00	2	.....
P. B. X. Swbds	272,860.00	4	.....
Booths and Spec. Fittings	6,982.00	4	.....
Total Equip.	$2,431,416.00		$ 10,326.00
Aerial Plant—			
Pole Lines	708,618.00	6	.....
Aerial Cable	1,178,086.00	7	.....
Aerial Wire	284,982.00	4	.....
Drop Wire	190,745.00	2	.....
1 Pr. Lead Cable	26,775.00	2	.....
Total Aerial	$2,389,206.00		
Underground Plant—			
Underground Conduit	957,207.00	12	.....
Underground Cable	1,427,253.00	9	.....
Total Underground	$2,384,460.00		
Terminals—			
Terminals Aerial	32,189.00	7	.....
Terminals U. G.	54,580.00	9	.....
Right-of-way	30,600.00	9	.....
Total	$8,462,537.00		$ 18,077.00

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TABLE No. 20.

INTERMEDIATE.

P. S. C. ESTIMATE TAXES DURING CONSTRUCTION.

St. Louis and East St. Louis Plants.

(Item 20, Table No. 1.)

Class of Plant.	Total Cost Including Omissions and Contingencies.	Mean Time During Construction Months.	Taxes 2.2% Per Annum on 60% Valuation. Amount.
Real Estate—			
Land	$ 494,200.00	24	$ 13,047.00
Buildings	645,886.00	12	8,526.00
Total R. E.	$1,140.086.00		$ 21,573.00
Equipment—			
C. O. Equip.	1,475,144.00	7	11,359.00
Station Apparatus and Installation	676,430.00	2	1,488.00
P. B. X. Swbds.	272,860.00	4	1,201.00
Booths and Spec. Fittings	6,982.00	4	31.00
Total Equip.	$2,431,416.00		$ 14,079.00
Aerial Plant—			
Pole Lines	708,618.00	6	4,677.00
Aerial Cable	1,178,086.00	7	9,071.00
Aerial Wire	284,982.00	4	1,254.00
Drop Wire	190,745.00	2	420.00
1 Pr. Lead Cable	26,775.00	2	59.00
Total Aerial	$2,389,206.00		$ 15,481.00
Underground Plant—			
U. G. Conduit	957,207.00	12	12,635.00
U. G. Cable	1,427,253.00	9	14,130.00
Total U. G.	$2,384,460.00		$ 26,765.00
Terminals—			
Terminals Aerial	32,189.00	7	248.00
Terminals U. G.	54,580.00	9	540.00
Right-of-way	30,600.00	9	303.00
Total	$8,462,537.00		$ 78,989.00

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TABLE No. 21.

INTERMEDIATE.

P. S. C. ESTIMATE OF INTEREST DURING CONSTRUCTION.

St. Louis and East St. Louis Plants.

(Including Engineering on R. E.)

(Item 21, Table No. 1.)

	Total Cost Except Interest During Construction.	Mean Time Months.	Interest During Construction 8%.
Real Estate—			
Land	$ 507,247.00	24	$ 84,406.00
Buildings	662,162.00	12	52,973.00
	$1,169,409.00		$137,379.00
Equipment—			
C. O. Equipment	1,496.829.00	7	69,852.00
Station Apparatus	677,918.00	2	9,039.00
P. B. X. Swbds.	274,061.00	4	7,308.00
Booths and Spec. Fittings	7,013.00	4	187.00
	$2,455,821.00		$ 86,386.00
Aerial Plant—			
Pole Lines	713,295.00	6	28,532.00
Aerial Cable	1,187,157.00	7	55,401.00
Aerial Wire	286,236.00	4	7,633.00
Drop Wire	191,165.00	2	2,549.00
1 Pr. Lead Cable	26,834.00	2	358.00
	$2,404,687.00		$ 94,473.00
Underground Plant—			
Underground Conduit	969,842.00	12	77,587.00
Underground Cable	1,441,383.00	9	86,483.00
	$2,411,225.00		$164,070.00
Terminal Aerial	32,437.00	7	1,512.00
Terminal Underground	55,120.00	9	3,307.00
Right-of-way	30,903.00	9	1,854.00
Engineering @ 5%	423,127.00	15	42,990.00
Totals	$8,982,729.00		$531,971.00

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Quantity Tables

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TABLE No. 22.

QUANTITY.

Exchanges Comprising the St. Louis and East St. Louis District.

(Item 3, Table No. 1.)

Name and Location.	No. of "A" Section.	No. of "B" Section.	No. of "A & B" Multiple.	Ans. Jacks.	O. G. T. Jacks.
Benton—Marshall & Manchester..	5	..	7500	1400	800
Bomont—Locust & Beaumont....	6	5	24800	3940	1880
Cabany—Delmar & Skinker.....	14	7	75000	3800	6380
Forest—Delmar & Lake Monroe—Delmar & Lake	24	13	220800	9090	17140
Grand—Grand & McRee.....	9	8	49000	4460	5300
Lindell—3938 Olive St.....	13	8	152400	5690	8640
Main—10th & Olive St.....	21	10	175500	6090	18940
Olive—10th & Olive St.....	18	11	89300	7310	22340
Sidney—11th & Sidney.....	8	5	28000	3610	3560
South—6817 Minnesota Ave.....	4	..	7800	1210	520
Tyler—11th and Chambers.....	8	5	49700	2700	2500
East St. Louis, 8th & Mo. Ave....	8	4	46300	3520	2100
Total.....	138	76	926100	52820	90100

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TABLE No. 23.

ST. LOUIS AND EAST ST. LOUIS EXCHANGE PLANT, AS OF JUNE 1, 1912.

Central Office.	Regular Stations.	Extension Stations.	P. B. X. Stations.	Total Stations.	P. B. X. Boards.
Benton	1,044	24	32	1,100	1
Bomont	2,080	142	387	2,609	32
Cabany	4,443	393	347	5,183	17
Forest	6,024	963	1,217	8,204	62
Monroe	1,172	70	54	1,296	7
Grand	4,034	251	212	4,497	16
Lindell	4,798	524	899	6,221	52
Main.	2,735	1,018	6,637	10,390	287
Olive	3,120	392	3,292	6,804	164
Sidney	3,985	142	233	4,360	17
South	1,444	46	11	1,501	1
Tyler	3,300	182	605	4,087	45
East St. Louis	2,321	209	592	3,122	25
Total	40,500	4,356	14,518	59,374	726

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TABLE No. 24.

QUANTITY.

Telephones and Auxiliary Apparatus.

(Item 4, Table No. 1.)

Quantity.	Code.	Article.
16,915	20 S	Desk Sets.
658	22	Desk Sets.
8,143	20 B	Desk Sets.
1,570	10	Desk Sets.
1	20 M	Desk Sets.
1	20 R	Desk Sets.
18	20 H	Desk Sets.
1	20 T	Desk Sets.
230	20 S. C.	Desk Sets.
1	20 F	Desk Sets.
4,905	20	Desk Sets.
10	20 P	Desk Sets.
9	20 C	Desk Sets.
1	26	Desk Sets.
1	9	Desk Sets.
8,271	212 A	Coil Boxes.
4,264	212	Coil Boxes.
13,599	295 A	Coil Boxes.
1,024	20	Coil Boxes.
1,048	78 F	Coil Boxes.
414	262 A	Coil Boxes.
14	10	Coil Boxes.
1	273 A	Coil Boxes.
50	105	Coil Boxes.
6	131 J	Coil Boxes.
7	233	Coil Boxes.
1	101 K	Coil Boxes.
4,383	295	Coil Boxes.
7	135	Coil Boxes.
11	137	Coil Boxes.
33	212 E	Coil Boxes.
66	295 E	Coil Boxes.
9	124	Coil Boxes.
3	292	Coil Boxes.
4	334 A	Coil Boxes.
34	295 A. C.	Coil Boxes.
5	225	Coil Boxes.
2	206	Coil Boxes.
2	262 E	Coil Boxes.
1	318 A	Coil Boxes.

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TABLE No. 24—Continued.

Quantity.	Code.	Article.
3,310	85	Subscriber Sets.
5,104	124 A	Subscriber Sets.
280	124 J	Subscriber Sets.
3,337	293 A	Subscriber Sets.
3,520	293 J	Subscriber Sets.
221	225	Subscriber Sets.
1,797	210 G	Subscriber Sets.
799	69	Subscriber Sets.
34	985	Subscriber Sets.
2	293 E	Subscriber Sets.
64	317 N	Subscriber Sets.
6	2	Hand Sets.
28	301 A	Subscriber Sets.
13	300 M	Hand Generators.
1	311 R	Subscriber Sets.
29	305 A	Subscriber Sets.
107	98	Subscriber Sets.
2,746	210 F	Subscriber Sets.
925	130	Subscriber Sets.
61	135	Subscriber Sets.
8	317 R	Subscriber Sets.
1	Long Distance.	Subscriber Sets.
66	300 A	Hand Generator.
26	124 E	Subscriber Sets.
1	317 K	Subscriber Sets.
14	217	Subscriber Sets.
86	300 L	Hand Generators.
39	295 A	Subscriber Sets.
12	317 A. T.	Subscriber Sets.
2	240	Subscriber Sets.
3	105	Subscriber Sets.
7	21	Subscriber Sets.
19	124 K	Subscriber Sets.
1,164	85 F	Subscriber Sets.
1	317 M	Subscriber Sets.
1	300 N	Hand Generators.
19	Battery Boxes.	Hand Generators.
4	138 A	Hand Generators.
3	303	Hand Generators.
2	299 F	Hand Generators.
4	22 A	Hand Generators.
14	5	Hand Generators.
7	284	Hand Generators.
1	315	Hand Generators.
30	20 A	Sub. Bracket Desk.

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TABLE No. 24—Continued.

Quantity.	Code.	Article.
78	40 B	Sub. Bracket Desk.
340	40 F	Sub. Bracket Desk.
529	40 D	Sub. Bracket Desk.
65	117	Jacks.
40	77	Jacks.
4	49	Jacks.
30	Restaurant.	Jacks.
10	110	Plug.
29	85	Plug.
330	61 A	Protectors.
100	84 A	Protectors.
19,161	58 A	Protectors.
155	12 A	Protectors.
3	12 B	Terminals.
100		Baird Coin Collectors.
206		Gray Coin Collectors.
81		Blue Bell Collectors.
3,775	7 E	Coin Collectors.
5,110	7 A	Coin Collectors.
214	8	Coin Collectors.
881	No. 6	Dry Cells.
1	No. 5	Induction Coils.
3,387	133 A	Black Boards.
38	63	Black Boards.
14	134	Black Boards.
971	43	Bell.
299	272	Moore Gong.
144		Stand Pipes and Flanges.
36	92 A	Key 3.
1	351 A	Key 3.
78	378 A	Key 3.
72	53	Key 3.
3,292		Enameled Signs.

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TABLE No. 25.

QUANTITY.

Private Branch Exchanges.

(Item 5, Table No. 1.)

Number.	Finish.	Code.	
156	Oak	101	Private Exchange Sections.
8	Mahogany	101	Private Exchange Sections.
27	Oak	102	Private Exchange Sections.
9	Mahogany	102	Private Exchange Sections.
216	Oak	4–30	Private Exchange Sections.
61	Oak	4–80	Private Exchange Sections.
56	Mahogany	4–30	Private Exchange Sections.
18	Mahogany	4–80	Private Exchange Sections.
18	Oak	Cordless	Private Exchange Sections.
23		Special	Private Exchange Sections.
592	Sections operating.		13,660 Stations.
153	No. 2 Semi-Automatic Exchanges operating.		858 Stations.

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TABLE No. 26.

QUANTITY.

Booths and Equipment.

(Item 6, Table No. 1.)

Southern Hotel	4	No. 10 Brownell Booths & Equipment.
American Hotel	1	No. 25 Brownell Booth & Equipment.
Maryland Hotel	2	No. 20 Brownell Booths & Equipment.
Mercantile Club	1	No. 20 Brownell Booth & Equipment.
Western Union Tel. Co.	1	No. 159 Cadwell Booth & Equipment.
Planters Hotel	4	No. 20 Brownell Booths & Equipment.
	1	Attendant's desk.
Coliseum	1	No. 10 Brownell Booth & Equipment.
Union Station	4	No. 10 Brownell Booths & Equipment.
	1	Attendant's desk.
Swift's Drug Store	1	No. 20 Brownell Booth & Equipment.
Jefferson Hotel	4	Special. Booth & Equipment.
	1	Attendant's desk.
Bell Telephone Co.	2	No. 159 Cadwell Booths & Equipment.
	1	Attendant's desk.
Marquette Hotel	3	Special Brownell Booths & Equipment.
Terminal Hotel	2	No. 3 Brownell Booths & Equipment.
	2	No. 25 Brownell Booths & Equipment.
Washington Hotel	1	No. 10 Brownell Booth & Equipment.
Merchants Exchange	1	No. 20 Brownell Booth & Equipment.
	4	No. 10 Brownell Booths & Equipment.
Delmar Garden	1	Blue Bell (double) Booth & Equipment.
Belcher Hotel	2	No. 25 Brownell Booths & Equipment.
Madison Pharmacy	1	No. 25 Brownell Booth & Equipment.
Herman's Drug Store	1	No. 25 Brownell Booth & Equipment.
Buckingham Hotel	2	No. 25 Brownell Booths & Equipment
Richard Kring Drug Store	1	No. 25 Brownell Booth & Equipment.
Laclede Hotel	2	No. 20 Brownell Booths & Equipment.
	1	Attendant's desk.
St. James Hotel	1	No. 25 Brownell Booth & Equipment.
Windemere Hotel	2	No. 20 Brownell Booths & Equipment.
Illmo	2	No. 25 Brownell Booths & Equipment.
National Stock Yards	1	No. 25 Brownell Booth & Equipment.

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TABLE No. 27.

QUANTITY.

Poles—City Exchanges.

(Item 7, Table No. 1.)

Height	Plain in Earth	Creosoted in Earth	Plain in Concrete	Creosoted in Concrete
25 ft.	292	6	1	0
30 ft.	1,902	616	33	8
35 ft.	10,983	1,649	752	58
40 ft.	3,665	205	133	7
45 ft.	2,087	38	22	0
50 ft.	3,690	6	18	0
55 ft.	1,007	3	10	0
60 ft.	236	0	0	0
65 ft.	33	0	0	0
70 ft.	9	0	0	0
Stubs ft.	496	4	44	2
Slugs ft.	6	..	..	..
Totals	24,406	2,527	1,013	75

TABLE No. 28.

QUANTITY.

Pole Fittings—City Exchanges.

(Item 7, Table No. 1.)

Cross Arms.		
10 Pin Wood	43,296	
4 Pin Wood	509	
1 Pin Brackets	13,180	
Guy Wire ¼"	121,089	ft.
⅜"	503,476	ft.
½"	127,641	ft.
⅝"	42,735	ft.
Wheel Guards	45,645	lbs
Shims	9,258	set
Guy Insulators	766	
Anchors	307	
Pole Steps	287,102	
Guy Clamps	21,206	

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TABLE No. 29.

QUANTITY.

Aerial Cable—City Exchanges.

(Item 8, Table No. 1.)

15	Pr.	22	Ga.	83,022 ft.
25	Pr.	22	Ga.	13,250 ft.
25	Pr.	19	Ga.	6,940 ft.
30	Pr.	22	Ga.	704,463 ft.
30	Pr.	19	Ga.	14,545 ft.
50	Pr.	22	Ga.	16,780 ft.
50	Pr.	19	Ga.	23,022 ft.
50	Pr.	18	Ga.	35,786 ft.
60	Pr.	22	Ga.	492,681 ft.
60	Pr.	19	Ga.	274,177 ft.
100	Pr.	22	Ga.	7,066 ft.
120	Pr.	22	Ga.	282,177 ft.
120	Pr.	19	Ga.	239,103 ft.
200	Pr.	22	Ga.	150 ft.
200	Pr.	19	Ga.	1,464 ft.
240	Pr.	22	Ga.	199,587 ft.
240	Pr.	19	Ga.	6,083 ft.
300	Pr.	19	Ga.	2,557 ft.
480	Pr.	22	Ga.	9,142 ft.
Total				2,411,995 ft.

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TABLE No. 30.

QUANTITY.

Aerial Wire.

(Item 9, Table No. 1.)

Place	Miles Aerial Exchange	Miles Toll Wires
South	400	193
Sidney	750	116
Bomont	210	60
Lindell	380	70
Benton	180	82
Forest	440	69
Grand	455	164
Tyler	1,150	60
Cabany	240	26
Main	281	...
TOTAL St. Louis City	4,486	840
St. Louis County	693	351
East St. Louis	656	94
Suburban	...	135
Totals	5,835	1,420

TABLE No. 31.

QUANTITY.

Drop Wire.

(Item 10, Table No. 1.)

Drop Wires—

25040 No. 14 Insulated Copper wire.
8150 No. 17 Insulated Copper Clad Steel wire.

Installation material included in installation cost.

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TABLE No. 32.

Underground Conduits.

Exchange District.	Trench Feet.	Duct Feet.	No. of Manholes.
Benton	none	none	none
Bomont	41,493	232,758	133
Cabany	28,172	231,084	75
Forest	47,198	387,414	137
Monroe	.....	.....	...
Grand	49,429	402,035	134
Lindell	43,471	316,355	129
Main	120,661	683,947	521
Olive	.....	.....	...
Sidney	37,607	288,967	117
South	1,209	8,894	7
Tyler	24,123	178,648	73
East St. Louis	19,972	224,488	69
Belleville	4,374	30,151	14
Totals	417,709	2,984,741	1,409

Pipe Laterals.
Number 2,035.
Lineal feet 155,496.

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TABLE No. 33.

QUANTITY.

Underground Cable—City Exchanges.

(Item 13, Table No. 1.)

15 Pr. 22 Ga.	10,037 ft.
25 Pr. 22 Ga.	3,401 ft.
25 Pr. 13 Ga.	990 ft.
30 Pr. 22 Ga.	59,579 ft.
50 Pr. 22 Ga.	792 ft.
50 Pr. 18 Ga.	1,138 ft.
60 Pr. 22 Ga.	50,494 ft.
60 Pr. 19 Ga.	816 ft.
100 Pr. 22 Ga.	2,028 ft.
120 Pr. 22 Ga.	34,431 ft.
120 Pr. 19 Ga.	148,630 ft.
150 Pr. 16 Ga.	14,690 ft.
200 Pr. 22 Ga.	345 ft.
240 Pr. 22 Ga.	154,153 ft.
240 Pr. 19 Ga.	81,067 ft.
250 Pr. Special	3,961 ft.
275 Pr. Special	11,950 ft.
300 Pr. 19 Ga.	141,205 ft.
360 Pr. 22 Ga.	600 ft.
400 Pr. 22 Ga.	2,667 ft.
480 Pr. 22 Ga.	524,193 ft.
600 Pr. 22 Ga.	35,225 ft.
Total	1,282,392 ft.

TABLE No. 34.

QUANTITY.

Miscellaneous Cable.

(Items 11 and 13, Table No. 1.)

House Cable—	
1 Pr. 22 Ga.	170,000 ft.
15 Pr. 22 Ga.	12,745 ft.
25 Pr. 22 Ga.	828 ft.
30 Pr. 22 Ga.	13,557 ft.
50 Pr. 22 Ga.	871 ft.
60 Pr. 22 Ga.	6,754 ft.
100 Pr. 22 Ga.	343 ft.
120 Pr. 22 Ga.	7,130 ft.
240 Pr. 22 Ga.	5,219 ft.
480 Pr. 22 Ga.	467 ft.
Total	217,914 ft.

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TABLE No. 35.

QUANTITY.

Terminals.

(Item 14, Table No. 1.)

Underground.			Aerial.		
Fuse Boxes	**No.**	**Size.**	**Not Protected**	**No.**	
	40	480 Pr.		2,231	
	1	300 Pr.		22	
	51	240 Pr.		3,139	
	52	120 Pr.		104	
	30	60 Pr.			
	7	50 Pr.			
	4	30 Pr.			
	3	25 Pr.			
	1	15 Pr.			
Pot Heads			**Protected**		
	160	30 Pr.		113	6(
	17	15 Pr.		18	5(
	3	10 Pr.		130	30
	6	5 Pr.		2	15
Cross Connecting Boxes					
	3	1,920 Pr.			
	2	960 Pr.			
	13	480 Pr.			
	18	240 Pr.			
	50	120 Pr.			
	44	60 Pr.			
	31	30–60 Pr.			
	75	30 Pr.			
	25	15-30 Pr.			
	5	25–50 Pr.			
	17	25 Pr.			
Protected Block Terminals					
	7	60 Pr.			
	2	50 Pr.			
	51	30 Pr.			
	9	25 Pr.			
	112	15 Pr.			
House and Building Terminals					
	1	100 Pr.			
	41	60 Pr.			
	9	50 Pr.			
	21	40 Pr.			
	404	30 Pr.			
	14	25 Pr.			
	24	20 Pr.			
	261	15 Pr.			
	60	12 Pr.			

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Comparison of Commission's Valuati and Companies' Claims for Construction Costs.

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COMPARISON OF COMMISSION'S VALUATION AND COMPANIES' CLAIMS FOR CONSTRUCTION COSTS.

ST. LOUIS AND EAST ST. LOUIS PLANTS.

In this case the company adopting the same assumption as the Commission that the combined St. Louis and East St. Louis properties would become the basis of rate making for St. Louis has made a detail check of the inventory and valuation work and has presented its own claims as to the proper amount to be assigned to these combined properties.

The comparison of the claims of the company and the allowances of the Commission are given in Table 36.

In making up a complete valuation the different elements to be considered may be classified under four different heads: First. Direct Construction Costs, which include only the cost of labor and material directly used in the construction of the plant. Second. The Secondary Construction Costs, such as engineering, Interest during Construction, Taxes during Construction, Insurance during Construction, etc., etc., which are true construction charges but are sometimes subject to considerable disagreement in estimate owing to the different methods assumed in their calculation. Third. Real Estate or Land, under which head there may in certain cases be wide disagreement of opinion from different Real Estate experts. Fourth. Investment or values not chargeable to existing plant. This class of values has been variously named and misnamed as Cost of Establishing Business, Going Value, Good Will, etc., etc., with sub classifications for Superseded Property and different losses or expenses which may or may not be rightfully classed as investment in the service of the Public.

In public valuations where the engineer staff of the municipality or state and the engineers for the company are both skilled in the work and both reasonable and fair minded, the difference between their respective estimates of the Direct Construction Costs of a property should never be very great. These direct Construction Costs are as a rule largely a question of fact and both parties, where there is a fair dealing and free and open exchange of information are almost certain to come to closely approximate results.

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This condition was illustrated by the results in the report of this Commission on the Union Electric Light and Power Company's property, where the company's claim for direct construction costs was $13,290,646.00 and the Commission's allowance was $12,586,741.00, a difference of only 5.51%. It was also illustrated in the report on the property of the United Railway's Company where the Direct Construction Costs claimed by the company were $32,063,160.00 and as allowed by the Commission were $30,237,137.00, a difference of only 5%.

In both of these cases there were wide differences between the Commission and the Company on items other than Direct Construction Costs but in the present case the company's claims do not differ widely from the findings of the Commission, not only as to Direct Construction Costs but also as the Secondary Construction Cost and as to the valuation of Real Estate or Land. As will be seen by the tables, the claim of the Company for both Direct and Secondary Construction Costs and the allowance of the Commission are $10,612,763.00, and $10,164,638.00, respectively, a difference of 4.4%.

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TABLE No. 36.

COMPARISON SUMMARY.

Physical Property.

	Class of Plant.	Public Ser. Commission.	Bell Tele. Company.
1.	Land	$ 494,200.00	$ 562,739.00
2.	Building	645,886.00	650,202.00
3.	C. O. Equipment	1,475,144.00	1,478,745.00
4.	Subscribers' Station Equipment	676,430.00	676,430.00
5.	P. B. X. Switchboards	272,860.00	282,287.00
6.	Booths and Fittings	6,982.00	7,271.00
7.	Poles and Fittings	708,618.00	738,556.00
8.	Aerial Cable	1,178,086.00	1,246,612.00
9.	Aerial Wire	284,982.00	330,066.00
10.	Drop Wire	190,745.00	188,927.00
11.	1 Pr. Lead Cable	26,775.00	27,517.00
12.	U. G. Conduit	957,207.00	1,001,227.00
13.	U. G. Cable	1,427,253.00	1,500,817.00
14.	Terminals	86,769.00	86,769.00
15.	Right-of-way	30,600.00	30,600.00
16.	Furniture and Fixtures	35,907.00	39,240.00
17.	Tools and Vehicles	76,830.00	76,830.00
	Direct Construction Costs	$ 8,575,274.00	$ 8,924,835.00
18.	Engineering	$ 423,127.00	$ 440,438.00
19.	Insurance During Construction	18,077.00	18,153.00
20.	Taxes During Construction	78,989.00	83,155.00
21.	Interest During Construction	531,971.00	423,998.00
22.	General	Not allowed	184,984.00
	Working Capital—Supplies	$ 169,200.00	$ 169,200.00
	Cash	368,000.00	368,000.00
	Secondary Construction Costs and Working Capital	$ 1,589,364.00	$ 1,687,928.00
	Grand Total	$10,164,638.00	$10,612,763.00

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TABLE No. 37.

COMPARISON.

Land.

			Commission Appraisal	Bell T. Co. Appraisal
Benton Exchange ....Rented Land				
Bomont Exchange	C. B. 928	Beaumont & Lo.	$ 15,000.00	$ 20,000.00
Cabany Exchange	C. B. 5408	Delmar Ave. ...	6,000.00	6,000.00
Forest Exchange	C. B. 5051A	Delmar Ave. ...	5,000.00	5,000.00
Monroe Exchahge Same as Forest				
Grand Exchange	C. B. 2123	McRee & Grand.	4,500.00	6,000.00
Lindell Exchange	C. B. 3926	Olive St.	12,500.00	12,500.00
Main Exchange	C. B. 274	Tenth & Olive .	150,000.00	200,000.00
Olive Exchange ..Same as Main				
Sidney Exchange	C. B. 793	11th & Sidney ..	2,400.00	2,900.00
South Exchange	C. B. 3001	Minnesota Ave..	5,000.00	5,000.00
Tyler Exchange	C. B. 349	Chambers St. ..	20,000.00	25,000.00
E. St. Louis Exchange	C. B. 47	8th & Mo. Ave..	15,000.00	15,000.00
Euclid Exchange	C. B. 5260	St. Louis Ave...	6,300.00	6,300.00
Tenth & Pine Exchange	C. B. 274	10th & Pine...	275,000.00	275,000.00
Total			$494,200.00	$551,705.00

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CONCLUSION.

The Commission from its own investigations has deduced no conclusions except as to the value of the property and has not investigated the accounts of the Company. The City having no longer the power to fix telephone rates, has now no occasion to make these investigations, and, consequently, we considered further investigation of this matter by us, after the creation of the State Public Service Commission, as a useless work.

But the Company has presented a statement of its revenue and operating expenses, which appear herein as Appendix B, and if it be conceded that these items are properly computed and the items charged to operating expenses are correctly placed in that account and its item of depreciation correctly estimated, it would appear from a consideration of the results of the Commission's valuation of the Company's property, in connection with this statement of revenue and expenses, that the business of the Company at the present rates of charge for service is not yielding a fair return upon the Company's investment in the service of the public. To what amount, if any, of increase in rates the Company is entitled can only be determined by a thorough investigation into the Company's methods of accounting, as well as into the relationship of the local Company with the parent Company, the American Telephone and Telegraph Company.

We, therefore, submit the results of the work done by us at the time of the enactment of the law creating the State Public Service Commission and withdrawing from the City the power to regulate public utilities.

Signed.....

.....

.....

ST. LOUIS, OCT. 14, 1913.

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Appendix A

Company's Claim for Cost to Establish Business

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INTRODUCTION TO APPENDIX A.

The correspondence herewith submitted as Appendix A contains the Company's presentation of the item of Cost to Establish the Business, and was prepared before the power of the City to regulate rates had been taken away by the repeal of the enabling act of May 8th, 1907. It is included here simply as the company's presentation of this part of its case.

In order that the Commission might arrive at its own conclusions as to the proper allowance for Cost to Establish the Business it would be necessary to employ expert accountants and to make an exhaustive study of the books of the company. This the Commission does not feel justified in doing under the existing circumstance of the city's lack of power to regulate the rates.

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COPY.

St. Louis, Mo., March 12th, 1913.

Mr. J. E. Allison, Com'r & Chief Engineer,
St. Louis Public Service Commission,
City Hall, St. Louis, Mo.

Dear Sir:

To date we have submitted to the Commission our appraisal of the St. Louis and East St. Louis Physical Telephone Exchange Plant, Associated Miscellaneous Property and Working Capital. The telephone property in St. Louis and East St. Louis is not, however, merely a combination of physical structure and working capital—it is something more than that; it is actually in operation, furnishing telephone service to approximately 59,000 stations, and we must, therefore, consider the expenditures involved in bringing the physical structure into its present operating condition, or what may be termed "The Cost of Establishing Business,"—for the various elements of which our appraisal shows the following:

Organization and Development	$ 295,000.00
Selling Service	234,000.00
Interest and Operating Expenses During Development	1,148,000.00
Total "Cost of Establishing Business"	$1,677,000.00

With respect to the above, we beg to submit the following:

Organization and Development.—This item covers the cost of building up the complete organization and system for the St. Louis and East St. Louis Exchange Property as it existed on June 30, 1912, including all preliminary work in connection with incorporation and organization of the Company, training of employees and establishment of records and systems required for the proper administration of the business. In our consideration of this item, we were unable to draw any reliable con-

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clusions from the records, as there was no accurate data as to how much had been expended in organizing the force and building up the organization to its present state of efficiency. As a matter of fact, it has been a gradual development which has been in process since the inception of the Company about thirty-four years ago.

We therefore carefully considered the decisions of public utility commissions and independent investigators with respect to this item, and found that they had been confronted with the same difficulty and had based their conclusions on a percentage of the total telephone plant and associated miscellaneous property. In general, 2½% seems to have been accepted as a fair and reasonable percentage. (Professor D. C. Jackson, acting as expert for the Massachusetts Highway Commission in the New England Telephone and Telegraph Company case, used approximately 3%. Milton G. Starrett, in the Milwaukee 3-cent fare case before the Wisconsin Commission, used 2%. Professor Cooley in the same case, used 2½%. In the Macon Water case, the Board of Appraisers used 2½%. In the Camden Telephone rate case, decided January, 1913, the Board of Public Utility Commissioners of New Jersey accepted 2½%.)

We have appraised this item at $295,000.00 or 3% of the physical telephone plant and associated miscellaneous property. We believe that this is a fair and reasonable percentage for St. Louis and East St. Louis, owing to the difficulties involved in developing the organization, establishing systems and routines, and training the force in the operation of the highly complex telephone property which is devoted to the service of the public in this, the fourth largest city in the United States.

Selling Service.—This item covers the cost of soliciting new subscribers and the advertising costs associated therewith. A study of these items for the past two years showed an average cost of $4.00 per telephone station, which applied to the total number of stations in service in St. Louis and East St. Louis on June 30th, 1912,—58,516, gives a total of approximately $234,000.00 as the cost of selling service.

Interest and Operating Expenses During Development.—As in the case of "Organization and Development," it is impossible to determine from our records the amount covering interest and

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operating expense during development. As a fair measure of what this item has amounted to, we have computed what it would amount to if the Exchange Property in St. Louis and East St. Louis were reproduced, assuming that it would be built and brought into its present operating condition in a minimum length of time. It is estimated that a minimum period of four years would be required to construct the property and develop the business to the point reached on June 30, 1912, and that the work would be sufficiently advanced at the end of two years and three months, to furnish service on a small scale.

The interest and operating expenses during this minimum period of four years were determined, as follows:

1. Schedules were prepared, showing the expenditures that would be necessary at various periods during the four years, having in mind the time elements involved in the organization of the corporation, preparation of plans by the engineers and the construction of the various classes of plant, the entire schedule being arranged with a view to furnishing service at the earliest possible moment. (See Statements 1 and 2, and Curve "A".)

2. An estimate was made of the number of stations which would be furnished service at the time of beginning operation, and the rate at which additional stations would be connected thereafter. (See Curve "A".)

3. Gross Revenue, from the time of beginning operation to the end of the four-year period, was based on the number of stations receiving service at various periods, and the annual revenue, per station, during 1912. (See Curve "B".)

4. Operating Expenses during the four-year period were determined from an analysis of the 1912 operating expenses and the relation between these expenses, the amount of plant maintained, and the number of stations receiving service. (See Curve "B".)

5. It was assumed that the total money required at various periods, as given in Statement 2, and the operating deficit, if any, would bear interest at the rate of 8% per annum, compounded annually. On this basis the total interest and operating deficits for each period are given in Statement No. 2.

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Summarizing the various items, as given in the attached statements, we have the following:

Total Interest During Development.....		$1,814,551.00
Total Operating Surplus	$332,400.00	
Total Operating Deficit	90,170.00	
Net Operating Surplus		242,230.00
Which deducted from the total interest, gives a net amount of		$1,572,321.00
In order to avoid duplication of interest charges, we must also deduct interest during construction, included in the appraisal of the physical property, amounting to ...		423,998.00
On this basis we obtain the net amount covering Interest and Operating Expenses During Development, amounting to.....		$1,148,323.00

Our appraisal of the Cost of Establishing Business,—$1,677,000.00, as given in the first page of this letter, is 16.4% on our appraisal of the Physical Telephone Plant and Associated Miscellaneous Property. (Physical Telephone Plant—$9,959,493.00 Miscellaneous Property—$285,270.00, total—$10,244,763.00.)

Westenhaver, et al, vs. Pioneer Telephone and Telegraph Company (Enid, Okla.—Telephone Rate Case), decided in 1911. The Supreme Court of Oklahoma allowed .....20 %

Gateley & Hurley Co., et al, vs. Delaware and Atlantic Tel. & Tel. Co. (Camden, N. J.—Telephone Rate Case). Decided January, 1913. The Board of Public Utility Commissioners of N. J. allowed 13.7%

Passaic Gas Rate Case recently decided. The Board of Public Utility Commissioners of N. J. allowed .....28 %

The above completes the appraisal of our St. Louis and East St. Louis Exchange property, a summary of which is given below:

Physical Telephone Plant....	$ 9,959,493.00	(Letter of Aug. 14, 1913.)
Miscellaneous Property	285,270.00	(Letter of Feb. 17, 1913.)
Working Capital	368,000.00	(Letter of Feb. 28, 1913.)
Cost of Establishing Business	1,677,000.00	(as given above.)
Total	$12,289,763.00	

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In connection with our appraisal of the "Cost of Establishing Business," we wish to call your special attention to the fact that in determining interest and operating expenses during development, nothing was included in the expense items for depreciation, on the theory that for rate-making purposes the property should not be depreciated to arrive at the fair and reasonable amount on which returns should be based. We believe that this, in general, is in accordance with the conclusions of the Commission as given in its "Report on the United Railways Company of St. Louis" in page 63, and further amplified in Appendix "A". Any consideration of the problem based on depreciating the property would also involve an allowance in the cost of establishing business, for depreciation during development, with the net result that this increased allowance would balance the amount deducted from the property for depreciation.

Very truly yours,

W. J. HISS,
General Manager.

Attached:

(Statements Nos. 1 and 2 and Curves "A" and "B".)

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TABLE No. 38.

THE BELL TELEPHONE COMPANY OF MISSOURI.

DETERMINATION OF THE COST OF ESTABLISHING BUSINESS. STATEMENT No. 1. DISTRIBUTION OF CONSTRUCTION EXPENDITURES DURING DEVELOPMENT.

St. Louis and East St. Louis Exchange Plant.

	Land.	Bldgs.	C. O. Equip.	Sta. Equip.	Pole Lines.	Aerial Cable.	Aerial Wire.	U. G. Conduit.	U. G. Cable.	Right of Way.	Engineering and Gen.	Total Construction.
1st Year												
1st Qr.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	$ 50,000	$ 50,000
2nd Qr.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	70,000	70,000
3rd Qr.	$300,000	.....	.....	.....	.....	.....	.....	$100,000	.....	$ 6,000	55,000	471,000
4th Qr.	.....	$100,000	.....	.....	$100,000	.....	.....	100,000	.....	6,000	62,000	368,000
2nd Year												
1st Qr.	277,595	100,000	.....	.....	100,000	$100,000	.....	100,000	.....	6,000	65,000	748,595
2nd Qr.	.....	100,000	$300,000	.....	100,000	100,000	.....	200,000	100,000	4,000	55,000	959,000
3rd Qr.	.....	100,000	300,000	$50,000	100,000	200,000	$20,000	175,000	200,000	3,000	50,000	1,198,000
4th Qr.	.....	100,000	200,000	75,000	50,000	200,000	40,000	125,000	200,000	1,000	40,000	1,031,000
3rd Year												
1st Qr.	.....	100,000	200,000	100,000	50,000	200,000	40,000	.....	200,000	800	35,000	925,800
2nd Qr.	.....	66,587	150,000	50,000	50,000	100,000	40,000	150,000	150,000	800	27,000	734,387
3rd Qr.	.....	.....	150,000	50,000	50,000	100,000	45,000	50,000	150,000	700	26,000	621,700
4th Qr.	.....	.....	100,000	75,000	30,000	75,000	55,000	50,000	150,000	600	24,000	559,600
4th Year												
1st Qr.	.....	.....	60,000	100,000	30,000	75,000	60,000	.....	100,000	500	17,000	442,500
2nd Qr.	.....	.....	40,482	150,000	30,000	50,000	90,000	75,000	110,000	500	15,000	560,982
3rd Qr.	.....	.....	.....	150,000	30,000	45,000	90,000	39,443	65,000	500	15,000	434,943
4th Qr.	.....	.....	.....	168,750	23,430	43,648	68,439	.....	45,796	503	9,422	359,988
Total ..	$577,595	$666,587	$1,500,482	$968,750	$743,430	$1,288,648	$548,439	$1,014,443	$1,507,796	$30,903	$625,422	$9,535,495

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THE BELL TELEPHONE COMPANY OF MISSOURI.

DETERMINATION OF THE COST OF ESTABLISHING BUSINESS. STATEMENT No. 2. DISTRIBUTION OF MISCELLANEOUS EXPENDITURES, INTEREST AND OPERATING EXPENSES DURING DEVELOPMENT.

St. Louis and East St. Louis Exchange Plant.

	Total Construction.	Miscellaneous Property.	Working Capital.	Organization and Development	Selling Service.	Operating Deficit.	Total Money Required During Each Quarter.	Cumulative Total Money Required to End of Each Quarter.	Quarterly Interest at 8% Per Annum (Compounded Annually) on the Total Money Required to End of Each Quarter.	Net Operating Surplus.
1st Year.										
1st Qr.....	$ 50,000	$ 25,000	$ 50,000	$ 70,000	.....	.....	$ 195,000	$ 195,000	$ 1,950	.....
2nd Qr.....	70,000	25,000	100,000	50,000	.....	.....	245,000	440,000	6,350	.....
3rd Qr.....	471,000	100,000	.....	40,000	.....	.....	611,000	1,051,000	14,910	.....
4th Qr.....	368,000	135,270	50,000	30,000	.....	.....	583,270	1,634,270	26,852	.....
2nd Year										
1st Qr.....	748,595	.....	.....	25,000	$5,000	$ 1,500	780,095	2,414,365	41,488	.....
2nd Qr.....	959,000	.....	.....	20,000	5,000	2,500	986,500	3,400,865	59,154	.....
3rd Qr.....	1,198,000	.....	.....	15,000	5,000	3,400	1,221,400	4,622,265	81,233	.....
4th Qr.....	1,031,000	.....	50,000	15,000	10,000	9,820	1,115,820	5,738,085	104,605	.....
3rd Year										
1st Qr.....	925,800	.....	.....	15,000	15,000	33,350	989,150	6,727,235	131,384	.....
2nd Qr.....	734,387	.....	.....	5,000	15,000	32,700	787,087	7,514,322	149,146	.....
3rd Qr.....	621,700	.....	.....	3,000	20,000	6,900	651,600	8,165,922	163,533	.....
4th Qr.....	559,600	.....	50,000	3,000	25,000	Cr. 7,000	630,600	8,796,522	176,355	.....
4th Year										
1st Qr.....	442,500	.....	.....	2,000	30,000	Cr. 28,000	446,500	9,243,022	199,534	.....
2nd Qr.....	560,982	.....	.....	2,000	40,000	Cr. 56,800	547,812	9,790,834	209,478	$ 1,630
3rd Qr.....	434,943	.....	.....	2,000	35,000	Cr. 97,800	469,943	10,260,777	219,655	97,800
4th Qr.....	359,988	.....	68,000	.....	29,000	Cr. 142,800	456,988	10,717,765	228,924	142,800
Total	$9,535,495	$285,270	$368,000	$295,000	$234,000	Cr. $242,230	$10,717,765	$10,717,765	$1,814,551	$242,230

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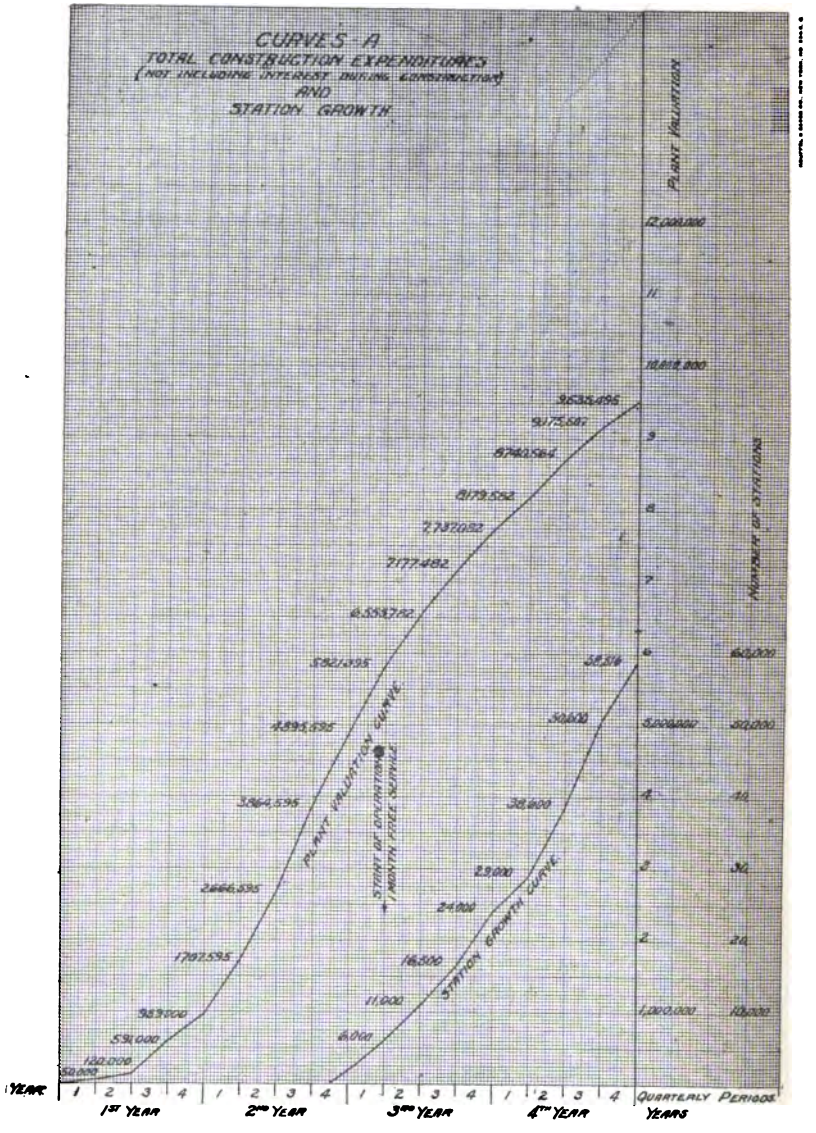

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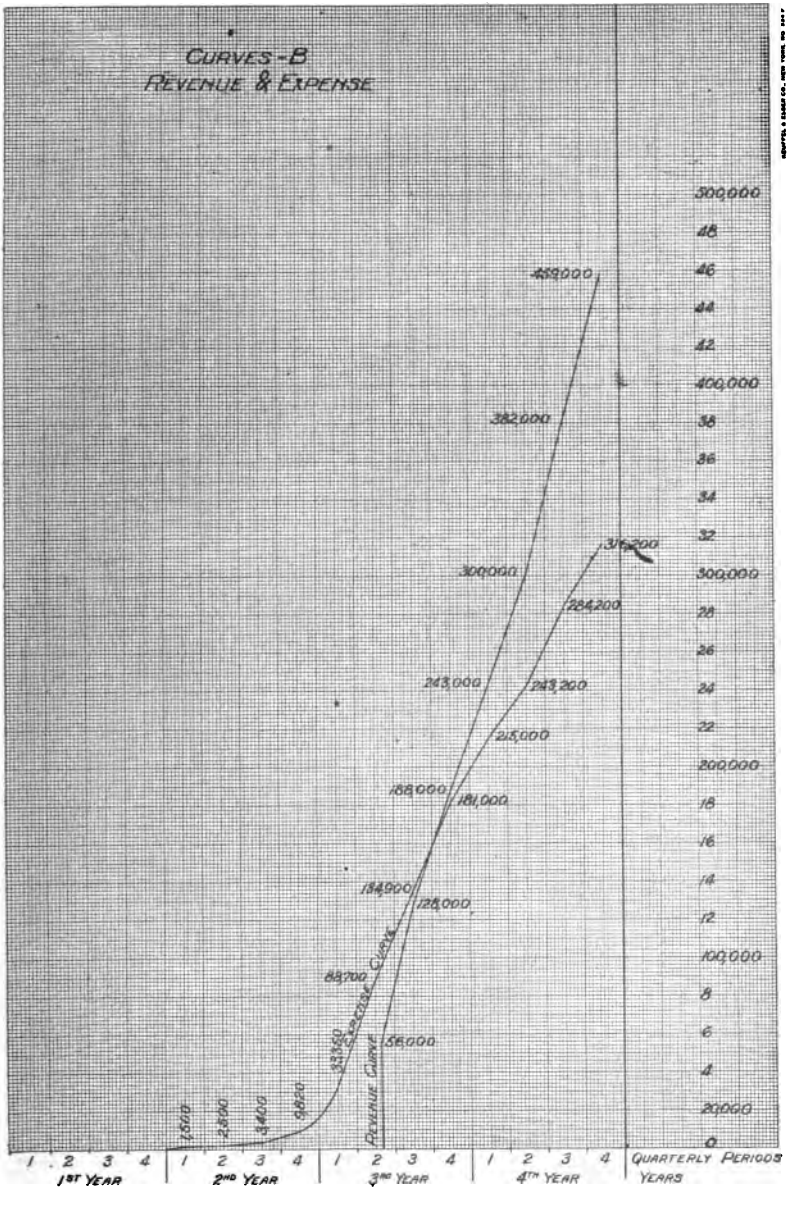

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Appendix B

Company's Statement of Revenue and Expense

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INTRODUCTION TO APPENDIX "B".

For the same reasons as given in the Introduction to Appendix "A" (see page 66) the Commission has made no findings as to the income and operating expenses of the company and herewith submits the following correspondence and statements without analysis, simply as the company's presentation of this part of its case.

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COPY.

St. Louis, Mo., Feb. 17, 1913.

Mr. J. E. Allison, Com'r and Chief,
St. Louis Public Service Commission,

City Hall, St. Louis, Mo.

Dear Sir:

In accordance with your request, I send you herewith statement, showing Revenue and Expenses for the Bell Telephone Company of Missouri, as follows:

Statement No. 1.—Revenue and Expenses for 1909, 1910, 1911 and 1912.

The totals for 1909 and 1910 are the same as given in the Haskins and Sells Report, with certain minor differences. We have, however, re-arranged the detailed figures so that they may easily be compared with the figures of 1911 and 1912.

Statement No. 2.—Revenue and Expenses for 1912—the old Bell Telephone Company of Missouri and the Hannibal District shown separately. In June, 1912, The Bell Telephone Company of Missouri acquired a large amount of telephone property in northeastern Missouri, comprising what we know as our Hannibal District. On this statement we have deducted the figures covering the Hannibal District from those of the entire company, in order to show the balance for the old Bell Telephone Company of Missouri comparable with the figures of 1909, 1910 and 1911, given in Statement No. 1.

Statements Nos. 3, 4 *and* 5.—Revenue and Expense for 1909, 1911 and 1912 for St. Louis and East St. Louis and balance of the territory. The figures given for 1909 and 1911 are taken from our books as we kept the charges separately during those years. It is not possible to give the figures for 1910, as during that year no separation was made between St. Louis and East St. Louis and the balance of the territory. During 1912, charges for St. Louis and East St. Louis were kept separately during the

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first six months. After that period no separation was made. The figures given in the attached statement are therefore based on the actual records for the first six months, and for the remaining six months we made a careful analysis of all of the important items approximating the balance on the basis of the first six months and the analysis of the important items during the last six months.

Statements Nos. 6 *and* 7.—Revenue and Expenses for 1909, 1911 and 1912, St. Louis and East St. Louis and balance of the old Bell Telephone Co. of Missouri territory.

In these statements we have brought together the figures for the three years for St. Louis and East St. Louis on Statement No. 6 and for the balance of the old Bell Telephone Co. of Missouri territory, on Statement No. 7, for your convenience in considering the general results.

The Depreciation amounts given in Statements 3 to 7, inclusive, are the amounts that should have been charged to expense. Owing to insufficient revenues, however, it was not possible in any of these years to make the proper provision for depreciation.

Pending a conference with the Commission, we have made no separation of Toll Revenue between St. Louis and East St. Louis and the balance of the territory.

Very truly yours,

W. J. HISS,
General Manager.

Attached: Statements Nos. 1 to 7, inclusive, covering Revenue and Expenses of The Bell Tel. Co. of Mo.

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TABLE No. 40.

Statement No. 1.

THE BELL TELEPHONE COMPANY OF MISSOURI.

Revenue and Expense for 1909, 1910, 1911 and 1912.

	1909.	1910.	1911.	1912.
TELEPHONE REVENUE.				
Exchange Revenue	$1,793,328.00	$1,878,684.00	$2,034,616.00	$2,291,919.00
Toll Revenue	171,560.00	179,423.00	181,217.00	238,564.00
Total Tel. Revenue	$1,964,888.00	$2,058,107.00	$2,215,833.00	$2,530,483.00
TELEPHONE EXPENSE.				
Operation—				
General		$ 63,525.00	$ 77,535.00	$ 72,642.00
Commercial		303,524.00	311,807.00	307,205.00
Traffic		342,049.00	428,442.00	496,384.00
Total	$655,584.00	$709,098.00	$817,784.00	$876,231.00
Less Amount Chgd. Construction	21,774.00	17,417.00	20,705.00	15,973.00
Net Amount	$633,810.00	$691,681.00	$797,079.00	$860,258.00
Rentals—				
Bell System	86,442.00	90,728.00	95,083.00	107,929.00
Conduit, Pole and Other Space	14,628.00	14,375.00	16,811.00	17,623.00
Total Rentals	$101,070.00	$105,103.00	$111,894.00	$125,552.00
Insurance	7,145.00	9,787.00	10,089.00	9,330.00
Total Operation	$742,025.00	$806,571.00	$919,062.00	$995,140.00
Current Maintenance—				
Maintenance	$336,374.00	$383,323.00	$471,263.00	$484,606.00
Extraordinary Rps.	6,000.00	6,000.00	6,000.00	18,500.00
Total Current Maintenance	$342,374.00	$389,323.00	$477,263.00	$503,106.00
Taxes	133,325.00	153,733.00	165,530.00	187,658.00
Total Expense Except Depreciation	$1,217,724.00	$1,349,627.00	$1,561,855.00	$1,685,904.00
Avg. Stas. in Ser. during Year	46,451	53,732	60,817	69,438
Exc. Rev. Per Station.	$38.61	$34.96	$33.45	$33.01
Toll Rev. per Sta.	3.69	3.34	2.98	3.43
Tot. Rev. per Sta.	$42.30	$38.30	$36.43	$36.44
Operation per Sta.	$15.97	$15.01	$15.11	$14.33
Cur. Mtce. per Sta.	7.37	7.25	7.85	7.25
Taxes Per Sta.	2.87	2.86	2.72	2.70
Total Expense Except Depreciation per Sta.	$26.21	$25.12	$25.68	$24.28

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TABLE No. 41.

Statement No. 2.

THE BELL TELEPHONE COMPANY OF MISSOURI.

Revenue and Expenses for 1912.

Old Bell of Missouri and Hannibal District Shown Separately.

	Entire Company From Statement No. 1.	Hannibal District.	Balance of Old Bell of Mo. Territory.
TELEPHONE REVENUE.			
Exchange Revenue	$2,291,919.00	$ 98,278.00	$2,193,641.00
Toll Revenue	238,564.00	29,925.00	208,639.00
Total Telephone Revenue	$2,530,483.00	$128,203.00	$2,402,280.00
TELEPHONE EXPENSE.			
Operation—			
General	$ 72,642.00	$ 3,026.00	$ 69,616.00
Commercial	307,205.00	14,402.00	292,803.00
Traffic	496,384.00	18,574.00	477,810.00
Total	$876,231.00	$36,002.00	$840,229.00
Less Amt. Chgd. Const'n.	15,973.00	639.00	15,334.00
Net Amount	$860,258.00	$35,363.00	$824,895.00
Rentals			
Bell System	107,929.00	5,840.00	102,089.00
Con. Pole and Other Space	17,623.00	802.00	16,821.00
Total Rentals	$125,552.00	$ 6,642.00	$118,910.00
Insurance	9,330.00	168.00	9,162.00
Total Operation	$995,140.00	$42,173.00	$952,967.00
Current Maintenance—			
Maintenance	$484,606.00	$22,435.00	$462,171.00
Extraordinary Repairs	18,500.00	1,700.00	16,800.00
Total Cur. Mtce.	$503,106.00	$24,135.00	$478,971.00
Taxes	$187,658.00	$ 3,850.00	$183,808.00
Total Expense Except Depreciation	$1,685,904.00	$70,158.00	$1,615,746.00
Average Stas. in Ser. During Year	69,438	7,905	65,152
Exc. Rev. Per Station	$33.01	$21.31	$33.67
Toll Rev. Per Station	3.43	6.49	3.20
Tot. Rev. Per Station	$36.44	$27.80	$36.87
Operation Per Station	$14.33	$ 9.15	$14.63
Current Main. Per Sta.	7.25	5.23	7.35
Taxes Per Sta.	2.70	.84	2.82
Total Expense Except Depreciation, Per Station.	$24.28	$15.22	$24.80

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TABLE No. 42.

Statement No. 3.

THE BELL TELEPHONE COMPANY OF MISSOURI.

Revenue and Expenses for 1909.

For St. Louis and East St. Louis and Balance of Territory.

	St. Louis and East St. Louis.	Balance of Territory.	Entire Company.
TELEPHONE REVENUE.			
Exchange Revenue	$1,725,281.00	$ 68,047.00	$1,793,328.00
Toll Revenue	.....	.....	171,560.00
Total Telephone Revenue	$1,725,281.00	$ 68,047.00	$1,964,888.00
TELEPHONE EXPENSE.			
Operation—			
General	.....	.....	.....
Commercial Supervision.	.....	.....	.....
Commercial Expense	.....	.....	.....
Traffic Supervision	.....	.....	.....
Traffic Expense	.....	.....	.....
Total	$589,880.00	$ 43,930.00	$633,810.00
Rentals			
Bell System	$ 82,372.00	$ 4,071.00	$ 86,443.00
Conduit, Pole & Other	14,237.00	391.00	14,628.00
Total Rentals	$ 96,609.00	$ 4,462.00	$101,071.00
Insurance	6,623.00	522.00	7,145.00
Total Operation	$693,112.00	$48,914.00	$742,026.00
Current Maintenance—			
Maintenance	$295,831.00	$ 40,543.00	$336,374.00
Extraordinary Repairs	5,100.00	900.00	6,000.00
Total Cur. Mtce.	$300,931.00	$ 41,443.00	$342,374.00
Taxes	$118,887.00	$ 14,438.00	$133,325.00
Total Expense Except Depreciation	$1,112,930.00	$104,795.00	$1,217,725.00
Depreciation	473,000.00	82,000.00	555,000.00
Total Expense	$1,585,930.00	$186,795.00	$1,772,725.00
Average Stas. in Service During Year	43,192	3,259	46,451
Exchange Rev. Per Sta.	$39.94	$20.88	$38.61
Toll Rev. Per Station	.....	.....	3.69
Total Rev. Per Station	$39.94	$20.88	$42.30
Operation Per Station	$16.05	$15.01	$15.97
Cur. Mtce. Per Sta.	6.97	12.72	7.37
Taxes Per Station	2.75	4.43	2.87
Total Expense Except Depreciation Per Station	$25.77	$32.16	$26.21
Depreciation Per Station	$10.95	$25.16	$11.95
Total Expense Including Depreciation Per Sta.	$36.72	$57.32	$38.16

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TABLE No. 43.

Statement No. 4.

THE BELL TELEPHONE COMPANY OF MISSOURI.

Revenue and Expenses for 1911.

For St. Louis and East St. Louis, and Balance of Territory.

	St. Louis and East St. Louis	Balance of Territory.	Entire Company.
TELEPHONE REVENUE.			
Exchange Revenue	$1,941,138.00	$ 93,478.00	$2,034,616.00
Toll Revenue	.....	.....	181,217.00
Total Telephone Rev...	$1,941,138.00	$ 93,478.00	$2,215,833.00
TELEPHONE EXPENSE.			
Operation—			
General	$ 61,182.00	$ 5,136.00	$ 66,318.00
Commercial Supervision.	21,660.00	1,231.00	22,891.00
Commercial Expense ...	268,945.00	15,279.00	284,224.00
Traffic Supervision	22,853.00	1,669.00	24,522.00
Traffic Expense	371,968.00	27,156.00	399,124.00
Total.....	$746,608.00	$ 50,471.00	$797,079.00
Rentals			
Bell System	$ 88,427.00	$ 6,656.00	$ 95,083.00
Con. Pole and Other Space	16,802.00	9.00	16,811.00
Total Rentals.....	$105,229.00	$ 6,665.00	$111,894.00
Insurance	10,032.00	57.00	10,089.00
Total Operations.....	$861,869.00	$ 57,193.00	$919,062.00
Current Maintenance—			
Maintenance	$436,455.00	$ 34,808.00	$471,263.00
Extraordinary Repairs..	5,100.00	900.00	6,000.00
Total Cur. Maintenance	$441,555.00	$ 35,708.00	$477,263.00
Taxes.....	$137,447.00	$ 28,083.00	$165,530.00
Total Expense Except Depreciation.....	$1,440,871.00	$120,984.00	$1,561,855.00
Depreciation	490,397.00	86,541.00	576,938.00
Total Expense.....	$1,931,268.00	$207,525.00	$2,138,793.00
Average Stas. in Ser. During the Year	56,464	4,353	60,817
Exchange Rev. Per Sta....	$34.38	$21.47	$33.45
Toll Rev. Per Sta.....	.....	.....	2.98
Total Rev. Per Sta.....	$34.38	$21.47	$36.43
Operation Per Station.....	$15.27	$13.14	$15.11
Cur. Mtce. Per Sta.	7.82	8.20	7.85
Taxes Per Station	2.43	6.45	2.72
Total Exp. Except Depreciation Per Station....	$25.52	$27.79	$25.68
Depreciation Per Station...	8.68	19.88	9.49
Total Exp. Including Depreciation Per Station.	$34.20	$47.67	$35.17

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TABLE No. 44.

Statement No. 5.

THE BELL TELEPHONE COMPANY OF MISSOURI.

Revenue and Expenses for 1912.

For St. Louis and East St. Louis and Balance of Old Bell of Missouri.

	St. Louis and East St. Louis.	Balance Old Bell of Mo.	Total Old Bell Mo.
TELEPHONE REVENUE.			
Exchange Revenue	$2,077,058.00	$116,583.00	$2,193,641.00
Toll Revenue	.....	.....	208,639.00
Total Telephone Revenue	$2,077,058.00	$116,583.00	$2,402,280.00
TELEPHONE EXPENSE.			
Operation—			
General	$ 56,168.00	$ 5,574.00	$ 61,742.00
Commercial Supervision.	23,755.00	1,695.00	25,450.00
Commercial Expense	246,416.00	17,575.00	263,991.00
Traffic Supervision	29,978.00	2,660.00	32,638.00
Traffic Expense	405,120.00	35,954.00	441,074.00
Total	$761,437.00	$ 63,458.00	$824,895.00
Rentals			
Bell System	$ 94,700.00	$ 7,389.00	$102,089.00
Con. Pole and Other Space	16,382.00	439.00	16,821.00
Total Rentals	$111,082.00	$ 7,828.00	$118,910.00
Insurance	8,422.00	740.00	9,162.00
Total Operation	$880,941.00	$ 72,026.00	$952,967.00
Current Maintenance—			
Maintenance	$417,943.00	$ 44,228.00	$462,171.00
Extraordinary Repairs	14,400.00	2,400.00	16,800.00
Total Cur. Maintenance	$432,343.00	$ 46,628.00	$478,971.00
Taxes	$156,535.00	$ 27,273.00	$183,808.00
Total Expense Except Depreciation	$1,469,819.00	$145,927.00	$1,615,746.00
Depreciation	602,660.00	95,000.00	697,660.00
Total Expense	$2,072,479.00	$240,927.00	$2,313,406.00
Average Stas. in Ser. During the Year	59,326	5,826	65,152
Exchange Rev. Per Sta.	$35.01	$20.01	$33.67
Toll Rev. Per Station	.....	.....	3.20
Total Rev. Per Station	$35.01	$20.01	$36.87
Operation Per Station	$14.85	$12.36	$14.63
Cur. Mtce. Per Sta.	7.28	8.00	7.35
Taxes Per Station	2.64	4.69	2.82
Total Exp. Except Depreciation Per Station	$24.77	$25.05	$24.80
Depreciation Per Station	10.16	16.30	10.71
Total Exp. Per Station	$34.93	$41.35	$35.51

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TABLE No. 45.

Statement No. 6.

THE BELL TELEPHONE COMPANY OF MISSOURI.

Revenue and Expenses for 1909, 1911, 1912,

For St. Louis and East St. Louis.

	1909	1911	1912
TELEPHONE REVENUE.			
Exchange Revenue	$1,725,280.00	$1,941,138.00	$2,077,058.00
TELEPHONE EXPENSE.			
Operation—			
General	.....	$ 61,182.00	$ 56,168.00
Commercial Supervision	.....	21,660.00	23,755.00
Commercial Expense	.....	268,945.00	246,416.00
Traffic Supervision	.....	22,853.00	29,978.00
Traffic Expense	.....	371,968.00	405,120.00
Total	$589,880.00	$746,608.00	$761,437.00
Rentals			
Bell System	$ 82,372.00	$ 88,427.00	$ 94,700.00
Con. Pole and Other Space	14,237.00	16,802.00	16,382.00
Total Rentals	$ 96,609.00	$105,229.00	$111,082.00
Insurance	6,623.00	10,032.00	8,422.00
Total Operation	$693,112.00	$861,869.00	$880,941.00
Current Maintenance—			
Maintenance	$295,831.00	$436,455.00	$417,943.00
Extraordinary Repairs	5,100.00	5,100.00	14,400.00
Total Cur. Maintenance	$300,931.00	$441,555.00	$432,343.00
Taxes	$118,887.00	$137,447.00	$156,535.00
Total Expense Except Depreciation	$1,112,930.00	$1,440,871.00	$1,469,819.00
Depreciation	473,000.00	490,397.00	602,660.00
Total Expense	$1,585,930.00	$1,931,268.00	$2,072,479.00
Average Stas. in Ser. During Year	43,192	56,464	59,326
Exchange Rev. Per Station	$39.94	$34.38	$35.01
Operation Per Station	$16.05	$15.27	$14.85
Cur. Mtce. Per Station	6.97	7.82	7.28
Taxes Per Station	2.75	2.43	2.64
Total Exp. Per Station	$25.77	$25.52	$24.77
Depreciation Per Sta.	10.95	8.68	10.16
Total Exp. Including Depreciation Per Station	$36.72	$34.20	$34.93

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TABLE No. 46.

Statement No. 7.
THE BELL TELEPHONE COMPANY OF MISSOURI.
Revenue and Expenses for 1909, 1911, 1912.
Balance of Old Bell of Missouri Territory.

	1909	1911	1912
TELEPHONE REVENUE.			
Exchange Revenue	$68,047.00	$93,479.00	$116,583.00
TELEPHONE EXPENSE.			
Operation—			
General		$ 5,136.00	$ 5,574.00
Commercial Supervision.		1,231.00	1,695.00
Commercial Expense		15,279.00	17,575.00
Traffic Supervision		1,669.00	2,660.00
Traffic Expense		27,156.00	35,954.00
Total	$ 43,930.00	$ 50,471.00	$ 63,458.00
Rentals			
Bell System	$ 4,071.00	$ 6,656.00	$ 7,389.00
Con. Pole and Other Space	391.00	9.00	439.00
Total Rentals	$ 4,462.00	$ 6,665.00	$ 7,828.00
Insurance	522.00	57.00	740.00
Total Operation	$ 48,914.00	$ 57,193.00	$ 72,026.00
Current Maintenance—			
Maintenance	$ 40,543.00	$ 34,808.00	$ 44,228.00
Extraordinary Repairs	900.00	900.00	2,400.00
Total Cur. Maintenance	$ 41,443.00	$ 35,708.00	$ 46,628.00
Taxes	$ 14,438.00	$ 28,083.00	$ 27,273.00
Total Expense Except Depreciation	$104,795.00	$120,984.00	$145,927.00
Depreciation	82,000.00	86,541.00	95,000.00
Total Expense	$186,795.00	$207,525.00	$240,927.00
Average Stas. in Ser. During Year	3,259	4,353	5,826
Exchange Rev. Per Station	$20.88	$21.47	$20.01
Operation Per Station	$15.01	$13.14	$12.36
Cur. Mtce. Per Station	12.72	8.20	8.00
Taxes	4.43	6.45	4.69
Total Exp. Except Depreciation	$32.16	$27.79	$25.05
Depreciation Per Station	25.16	19.88	16.30
Total Exp. Including Depreciation	$57.32	$47.67	$41.35

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COPY.

St. Louis, Mo., July 22, 1913.

St. Louis Public Service Commission,
St. Louis, Mo.

Dear Sir:

In accordance with your request of the twenty-first ultimo, I send you herewith statement showing Revenue, Expenses and Earnings of The Bell Telephone Company of Missouri for the years 1910, 1911 and 1912, the figures given being a transcript of the Auditor's records.

I would call your attention to the fact that the revenue and expense items except depreciation are identical with those given in Statement No. 1 which accompanied my letter of February 17, 1913, excepting the figures for 1910, in which instance both the revenue and expense items are approximately $4,000.00 higher than the figures given in the Statement of February 17th last, due to a difference in accounting practice with respect to certain small items during 1910 which was adjusted at the time the statement of February 17th was prepared, in order to bring the figures for the four years 1909 to 1912, inclusive, given in that statement to a comparable basis. The item of depreciation given in the enclosed statement shows the actual amounts charged on the books each year to expense. These amounts were, of course, entirely inadequate, owing to insufficient revenue. For example, by reference to Statements Nos. 4 and 5, which accompanied my letter of February 17, 1913, we find that the proper depreciation charge should have been:

	1911	1912
Amount Charged on Books....	$175,968	$391,828
Amount which should have been charged	576,938	750,160

This is made up of $697,660, covering the proper depreciation charge for the Old Bell of Missouri territory for 1912, as shown in Statement No. 5 of Feb. 17, 1913, and $52,500, the proper

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depreciation charge for the property in the Hannibal District for a period of seven months, that property having been acquired by The Bell Telephone Co. of Missouri on June 1, 1912. The revenue and expense figures for the Hannibal District are, of course, included in the statement which is herewith.

I would further call your attention to the fact that while the attached statement shows certain undivided profits for the years 1910, 1911 and 1912, we transferred $350,000.00 from the Surplus Account to the Depreciation Reserve Account, which amount should have been properly charged to expense, under the depreciation item, during the preceding years, with the result that undivided profits would have disappeared.

Very truly yours,

W. J. HISS,
General Manager.

Enclosure—Statements Showing Revenue Expenses and Earnings, The Bell Telephone Co. of Missouri, for 1910, 1911 and 1912.

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TABLE No. 48.

Supplementing Statement No. 1, which Accompanied Letter of February 17, 1913, to Mr. Jas. E. Allison, Commissioner and Chief Engineer, St. Louis Public Service Commission.

THE BELL TELEPHONE COMPANY OF MISSOURI.

Revenue, Expenses and Earnings, for 1910, 1911 and 1912.

TELEPHONE REVENUE.

	1910	1911	1912
Exchange Revenue.....	$1,881,768.73	$2,034,616.62	$2,291,918.65
Toll Revenue	180,267.08	181,216.76	238,563.94
Total Telephone Revenue	$2,062,035.81	$2,215,833.38	$2,530,482.59

TELEPHONE EXPENSE.

Operation.....	$810,028.04	$919,061.67	$995,140.05
Current Maintenance.....	383,322.86	471,262.69	484,605.66
Extraordinary Repairs.....	6,000.00	6,000.00	18,500.00
Taxes.....	154,368.49	165,530.15	187,658.33
Total Expense Except Depreciation.....	$1,353,719.39	$1,561,854.51	$1,685,904.04
Depreciation.....	138,000.00	175,968.00	391,828.00
Total Expenses.....	$1,491,719.39	$1,737,822.51	$2,077,732.04

TELEPHONE EARNINGS.

Net Telephone Earnings..	$570,316.42	$478,010.87	$452,750.55
Sundry Net Earnings ...	6,209.98	6,925.40	17,311.07
Total Net Earnings.....	$576,526.40	$484,936.27	$470,061.62
Deduct Interest	15,056.11	24,985.74	114,185.39
Balance Net Profits.....	$561,470.29	$459,950.53	$355,876.23
Deduct Dividends	527,280.00	351,520.00	351,520.00
Undivided Profits.....	$ 34,190.29	$108,430.53	$ 4,356.23

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Appendix C

Tentative Valuation Physical Property Suburban District

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SUBURBAN PROPERTY TABLES.

These tables are given to show the Commission's Estimate of the Physical Property of the Suburban Exchanges and the Overhead, Underground, Station Equipment, Buildings, Land, etc., connected therewith.

The valuation also includes the local suburban toll lines connecting these exchanges with St. Louis and with one another. The valuation does not include some outlying toll and Long Distance lines belonging to the company, nor does it include what is known as the Hannibal District, a property recently purchased by the Company. The De Soto Exchange is also omitted.

These Suburban valuations were made in order to have before the Commission any property which might by any possibility be shown to belong within the Rate Making District for St. Louis.

LIST OF SUBURBAN EXCHANGES.

Belleville,
Ferguson,
Clayton,
Kirkwood,
St. Charles,
Tri Cities,
Webster,
Florissant,
Bismark,
Eureka,
St. Clair.

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TABLE No. 49.

VALUATION OF SUBURBAN PHYSICAL PROPERTY.

Class of Plant.	Total Cost Including Omissions and Contingencies
Land	$ 7,890.00
Buildings	26,853.00
C. O. Equipment	110,487.00
Station Equipment	63,233.00
P. B. X. Switchboards	2,774.00
Pole Lines	191,073.00
Aerial Cable	211,254.00
Aerial Wire	52,931.00
Drop Wires	31,832.00
Underground Conduit	11,206.00
Underground Cable	42,800.00
Terminals	10,558.00
Right-of-Way	17,000.00
Engineering at 5%	38,995.00
Insurance During Construction	1,819.00
Taxes During Construction	5,574.00
Interest During Construction	38,110.00
Furniture and Fixtures	2,062.00
Tools and Vehicles	4,037.00
Working Capital—Supplies	12,720.00
Cash	21,555.00
	$904,763.00

TABLE No. 50.

P. S. C. ESTIMATED COST OF PHYSICAL PROPERTY.

Bell Telephone Company, Suburban Exchange Plant.

Class of Plant.	Total Cost Including Omissions and Contingencies
Land	$ 7,890.00
Buildings	26,853.00
C. O. Equipment	110,487.00
Station Equipment	63,233.00
P. B. X. Switchboards	2,774.00
Pole Lines	191,073.00
Aerial Cable	211,254.00
Aerial Wire	52,931.00
Drop Wires	31,832.00
Underground Conduit	11,206.00
Underground Cable	42,800.00
Terminals	10,558.00
Right-of-Way	17,000.00
Total	$779,891.00

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TABLE No. 51.

P. S. C. ESTIMATED ORIGINAL COST OF BELL TELEPHONE CO.'S SUBURBAN EXCHANGE PLANT AS OF JUNE, 1912.

Item.	Total.
Direct Costs Including Omissions and Contingencies..	$779,891.00
Engineering at 5%	38,995.00
Insurance During Construction	1,819.00
Taxes During Construction	5,574.00
Interest During Construction	38,110.00
	$864,389.00
Furniture and Fixtures	2,062.00
Tools and Vehicles	4,037.00
Working Capital—Supplies	12,720.00
Cash	21,555.00
Total	$904,763.00

TABLE No. 52.

SUBURBAN PROPERTY.

INTERMEDIATE.

Central Office Equipment.

(Item 3, Table No. 49.)

C. O. Equipment	$102,161.00
Supervision 2%	2,043.00
Store 1%	1,022.00
	$105,226.00
Cont. & Omission 5%	5,261.00
Total	$110,487.00

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TABLE No. 53.

SUBURBAN PROPERTY.

INTERMEDIATE.

Stations.

(Item 4, Table No. 49.)

5,512 Stations at $9.85	$54,293.00
5,512 Induction Coils at 35c	1,929.00
15% Supply Ex. on Material	4,000.00
	$60,222.00
5% Contingency	3,011.00
Total	$63,233.00

TABLE No. 54.

SUBURBAN PROPERTY.

INTERMEDIATE.

Private Branch Exchange Switch Boards.

(Item 5, Table No. 49.)

Semi Auto No. 2	$ 498.00
7-(101 & 4) Stand P. B. X.	1,639.00
	$2,137.00
Installation 20%	427.00
Store 5%	106.00
	$2,670.00
Supervision	50.00
Contingency 2%	54.00
Total	$2,774.00

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TABLE No. 55.

SUBURBAN PROPERTY.

INTERMEDIATE.

Poles and Fittings.

(Item 6, Table No. 49.)

217 Stubs and 13,512 Poles	$143,678.00
17,836 Cross Arms	24,890.00
1,351 Guys and Braces	8,106.00
	$176,674.00
Supervision 3%	5,300.00
	$181,974.00
Contingency 5%	9,099.00
Total	$191,073.00

TABLE No. 56.

SUBURBAN PROPERTY.

INTERMEDIATE.

Aerial Cable.

(Item 7, Table No. 49.)

Aerial Cable	$187,690.00
Supervision 2%	3,754.00
Store, 5% on $150,000.00	7,500.00
Extra Freight and Return of Reels, etc.	2,250.00
	$201,194.00
5% Contingency	10,060.00
Total	$211,254.00

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TABLE No. 57.

SUBURBAN PROPERTY.

INTERMEDIATE.

Aerial Wire.

(Item 8, Table No. 49.)

1,420 Miles at	$33.00	Material and Erection	$46,860.00
1,420 Miles at	1.25	Store	1,775.00
1,420 Miles at	1.25	Supervision	1,775.00
	$35.50		$50,410.00
5% Contingency			2,521.00
Total			$52,931.00

TABLE No. 58.

SUBURBAN PROPERTY.

INTERMEDIATE.

Drop Wire.

(Item 9, Table No. 49.)

5,512 Drop Wire	$30,316.00
5% Contingency	1,516.00
Total	$31,832.00

TABLE No. 59.

SUBURBAN PROPERTY.

INTERMEDIATE.

Underground Conduits.

(Item 10, Table No. 49.)

Laterals	$ 1,943.00
Underground Conduit	8,131.00
	$10,074.00
3% Supervision	302.00
	$10,376.00
8% Contingency	830.00
Total	$11,206.00

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TABLE No. 60.

SUBURBAN PROPERTY.

INTERMEDIATE.

Underground Cable.

(Item 11, Table No. 49.)

Underground Cable	$14,244.00
Recording Trunk Pairs	1,143.00
Local Toll Trunks	23,987.00
	$39,374.00
Supervision 2%	788.00
Store, 5% on $12,000.00	600.00
5% Contingency	2,038.00
Total	$42,800.00

TABLE No. 61.

SUBURBAN PROPERTY.

INTERMEDIATE.

Terminals.

(Item 12, Table No. 49.)

Terminals	$10,055.00
Cont. & Omission 5%	503.00
Total	$10,558.00

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TABLE No. 62.

INSURANCE DURING CONSTRUCTION.

SUBURBAN EXCHANGE PLANT.

(Item 15, Table No. 49.)

Class of Plant.	Total Cost Including Omissions and Contingencies.	Mean Time During Construction Months.	Insurance 2.5% on 80% Valuation.
Real Estate.			
Land	$ 7,890.00	24	.....
Buildings	26,853.00	12	$ 537.00
Totals	$34,743.00		$ 537.00
uipment.			
C. O. Equipment	$110,487.00	7	$1,282.00
Station Apparatus and Installation	63,233.00	2	.....
P. B. X. Switch Bds.	2,774.00	4	.....
Totals	$176,494.00		$1,282.00
erial Plant.			
Pole Lines	$191,073.00	6	.....
Aerial Cable	211,254.00	7	.....
Aerial Wire	52,931.00	4	.....
Drop Wire	31,832.00	2	.....
Totals	$487,090.00		.....
nderground Plant.			
U. G. Conduit	$ 11,206.00	12	.....
U. G. Cable	42,800.00	9	.....
Totals	$ 54,006.00		.....
Terminals	$ 10,558.00	7	.....
Right-of-way	17,000.00	9	.....
Totals	$779,891.00		$1,819.00

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TABLE No. 63.

TAXES DURING CONSTRUCTION.

SUBURBAN EXCHANGE PLANT.

(Item 16, Table No. 49.)

Class of Plant.	Total Cost Including Omissions and Contingencies.	Mean Time During Construction Months.	Taxes 2.2% on 60% Valuation.
Real Estate.			
Land	$ 7,890.00	24	$ 208.00
Buildings	26,853.00	12	354.00
Totals.....	$ 34,743.00		$ 562.00
Equipment.			
C. O. Equipment	$110,487.00	7	$ 851.00
Station Apparatus and Installation	63,233.00	2	139.00
P. B. X. Switch Bds. ...	2,774.00	4	12.00
Totals.....	$176,494.00		$1,002.00
Aerial Plant.			
Pole Lines	$191,073.00	6	$1,261.00
Aerial Cable	211,254.00	7	1,627.00
Aerial Wire	52,931.00	4	232.00
Drop Wire	31,832.00	2	70.00
Totals.....	$487,090.00		$3,190.00
Underground Plant.			
U. G. Conduit	$ 11,206.00	12	$ 148.00
U. G. Cable	42,800.00	9	423.00
Totals.....	$ 54,006.00		$ 571.00
Terminals	$ 10,558.00	7	$ 81.00
Right-of-way	17,000.00	9	168.00
Totals.....	$779,891.00		$5,574.00

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TABLE No. 64.

INTEREST DURING CONSTRUCTION.

SUBURBAN EXCHANGE PLANT.

(Item 17, Table No. 49.)

Class of Plant.	Total Cost Except Interest During Construction.	Mean Time Months.	Interest During Construction.
Real Estate.			
Land	$ 8,098.00	24	$1,348.00
Buildings	27,744.00	12	2,220.00
Totals	$ 35,842.00		$3,568.00
Equipment.			
C. O. Equipment	$112,620.00	7	$5,248.00
Station Apparatus and Installation	63,372.00	2	843.00
P. B. X. Switch Bds.	2,786.00	4	73.00
Totals	$178,778.00		$6,164.00
Aerial Plant.			
Pole Lines	$192,334.00	6	$7,693.00
Aerial Cable	212,881.00	7	9,920.00
Aerial Wire	53,163.00	4	1,414.00
Drop Wire	31,902.00	2	424.00
Totals	$490,280.00		$19,451.00
Underground Plant.			
U. G. Conduit	$ 11,354.00	12	$ 908.00
U. G. Cable	43,223.00	9	2,593.00
Totals	$ 54,577.00		$3,501.00
Terminals	$ 10,639.00	7	$ 496.00
Right-of-way	17,168.00	9	1,030.00
Totals	$787,284.00		$34,210.00
Engineering	38,995.00	15	3,900.00
Totals	$826,279.00		$38,110.00

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Appendix D

Should Public Service Properties be Depreciated to Obtain Fair Value In Rate or Regulation Cases?

By JAMES E. ALLISON, Commissioner and Chief Engineer St. Louis Public Service Commission

Report to St. Louis Public Service Commission, September 11, 1912

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PREFACE.

In the following discussion the writer has in mind only such public service property as may be called the municipal utilities, i. e., Electric Light and Power, Street Railways, Water, Telephones and Gas, and he is also dealing only with such aspects of so-called valuation as apply to rate making or equivalent regulation.

By equivalent regulation is meant such regulations of service as cause changes in the expense of operation or changes in the amount of investment necessary to serve the public, or both. It is evident that a regulation which causes a change in expense or a change in investment causes a change in the cost of the service, and is therefore equivalent to a change in the rates.

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Should Public Service Properties be Depreciated?

TO OBTAIN FAIR VALUE IN RATE OR REGULATION CASES?

PART I.

FAIR VALUE, MARKET VALUE, JUST AMOUNT.

In attempting to discuss the problem of the depreciation of a public service property to arrive at what the courts have called Fair Value, it becomes necessary to make some analysis or study of just what Fair Value can or does mean.

The term "Fair Value" may have at least two distinct meanings. It may mean that the result of valuation work should be a "Just Amount" upon which a company should earn reasonable returns, or it may mean simply the Market Value of the property fairly arrived at, but regardless of any questions of justice toward the real and efficient sacrifice made to produce the property in the service of the public.

As a matter of fact in rate cases the Market Value of a property as a whole is unattainable, for the Market Value depends largely upon its earning power, and this in turn depends upon the rates which are as yet not determined.

The only circumstances under which Market Value can be ascertained are when the returns are not the object of inquiry, but are already established or can be estimated. Logically the assumption of present Market Value as the basis of earnings, leads inevitably to the conclusion that there should be no regulation of reurns and that whatever *is* is just.

The basic idea underlying the term "Just Amount" is not Market Value, but that amount which would represent a just

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reward to the creators or owners of the property in return for the efficient sacrifice made in the service of the public, and the term "Just Amount" is used in that sense in this report.

It is evident from any study of the discussions and opinions of the courts and commissions in rate cases, that all of them intend broadly to establish "Just Amount" and not a Market Value as the "Fair Value," but even from the most able sources we occasionally find a tendency to allow the idea of Market Value to obtrude itself into their reasoning without seeming to recognize it as such.

The tendency to be influenced by the idea of Market Value appears in the recognition or partial recognition of certain theories sometimes presented for arriving at what may be called the "Gross Value" of a property (i. e. the value before depreciating) and it also appears in a very marked way in the recognition and use of certain theories in depreciating from Gross Value to arrive at what is assumed to be the Just Amount to be earned on.

It should not be necessary to present arguments that Just Amount and not Market Value is the proper standard for deciding the capital upon which public regulation should base reasonable returns. The only ground upon which Market Value, even if attainable, could be assumed to be "Fair Value" in rate cases, is that the chance fluctuations of Market Value are a fair gamble between the public and the investor, and even if this were granted it could only be a fair gamble if the investor and the public both had fair notice at the time the investment was made that such a set of gambling chances were a part of the understood contract between them. As nearly all public valuation work is done where there could have been no understanding when the investment was made as to the basis of future valuation, it is evident that Market Value cannot be assumed to be a just standard to adopt.

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PART II.

UNRELIABILITY OF DEPRECIATION CALCULATIONS.

There have developed in valuation work only two fundamental methods of depreciating from "Gross Value" to find so-called Present Value. One of these methods may be called Depreciating by Observation, which means simply that the amount of depreciation in value shall be determined after thorough inspection, by the judgment alone of persons familiar with such properties as the one under consideration.

The other fundamental method may be called Depreciating by Age and Average Estimated Life, which we may abbreviate to the Average Life method or the Remainder of Life method.

The observation method, if the results were not a mere matter of opinion and subject to all the vagaries of the human element, would be the most satisfactory as tending to establish the *actual* depreciation at the time of the valuation, while the Average Life method gives at best only a theoretical result which may or may not coincide with a very evident state of facts.

Under the head of Average Life method of depreciation we may group the two sub-methods known as the Sinking Fund method and the Straight Line method.

The Sinking Fund method contemplates assigning an arbitrary life for the item of equipment under consideration, and then assuming that its value at any fixed time during its assigned life will be equal to its cost or Gross Value, minus the amount accumulated in a fund produced by charges periodically made and so calculated that when bearing a determined rate of compound interest, they will at the end of the estimated life amount to the assigned cost or Gross Value of the item.

The value curve under the Sinking Fund method of a $100 piece of equipment with an estimated life of 20 years and a sinking fund bearing 4% compound interest, is shown in Fig. 1 by the line A.

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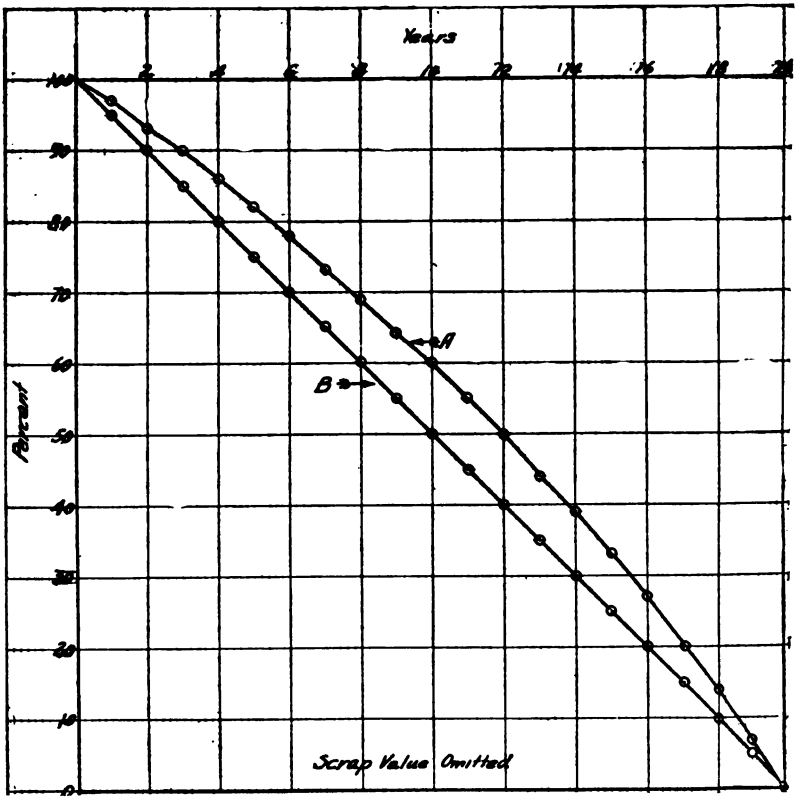

Figure 1.

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The Straight Line method contemplates assigning an arbitrary life for the item of equipment and then assuming that its value at any fixed period during its assigned life will be equal to its cost or Gross Value, minus the amount accumulated in a fund produced by equal charges periodically made, whose sum without interest will at the end of the estimated life amount to the cost or Gross Value of the item.

The value line of a $100 piece of equipment under the Straight Line method is shown in Fig. 1 by line B.

Both the Sinking Fund method and the Straight Line method are generally called Theoretical Depreciation, and that is about all that can be claimed for them.

On account of the very great chance for large error in the controlling factor of the estimated life of any item of equipment, it is evident that practically it may make little difference in trying to estimate the depreciation at any given time, whether the Sinking Fund or Straight Line method is used. But *theoretically* if we are endeavoring to ascertain a value and not merely trying to determine the means of obtaining a depreciation fund, the Straight Line method would appear the more logical, and if we assume that our estimated life is correct, then we can also logically assume that the Market Value of the item at any time (earning power being left out of account) is in direct proportion to its remainder of useful life, and this proportion is indicated by the readings of the Straight Line curve.

It is difficult to see how the Sinking Fund curve can be logically used for obtaining a depreciated value, as it is evident that the rate of interest will materially affect the shape of the curve and the consequent value points, while of course the rate of interest obtainable on the depreciation fund can have in fact no bearing on the remainder of value in any property at any given time.

There is another method of Theoretical Depreciation sometime known as the Diminishing Value method, but it is so seldom met with and is of so little practical value that it is not discussed here, but is shown briefly in the appendix to this report.

The extremely unsatisfactory condition of work in depreciation is evident when we consider that results in using the Obser-

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vation method depend entirely upon the very fallible judgment of the expert observer, and that results in the Average Life method depend upon mere guesses as to the average life of different kinds of equipment, and that even if this estimated average life should happen to be correct as an average, the propriety of applying it to any individual case can always be seriously questioned.

The impossibility of estimating the effect upon the useful life of equipment of the element of Obsolescence alone, makes any attempt to establish a life mere guess work if that element is taken into account, for we cannot prophesy what will be done for years in the future by inventors, designers and manufacturers in the arts relating to public service plants. There is no possible guide, for the working of obsolescence in the past can be of no help in estimating its effect in the future. There is no rule and no average will apply.

An examination of the estimates of life of different species of property as used in most published valuation reports will show that there is comparatively close agreement in the lives assigned to similar items of equipment. This might indicate that these estimates were the result of reliable statistics of experience gathered throughout the whole field where the class of equipment in question is used. As a matter of fact no such broad collection of reliable data has ever been made, and these estimates of average life admittedly represent only the opinions of certain men as to the probable average period of usefulness of different items of equipment. The fact that they coincide within certain limits, only goes to show that the later guessers did not care to differ very greatly from their predecessors on a subject concerning which there was very little to be found to support an argument one way or another.

It is true that some of the large public service companies have attempted to gather reliable life data, but this is true only as to a limited class of equipment, and even here the usefulness of the data is often destroyed by the changes constantly taking place in the type of the equipment.

Another and a very large element of uncertainty is introduced into the problem of depreciation by the fact that there is no line except an arbitrary one, to be drawn between Maintenance and Replacement. When we replace a bolt or a tie in a

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track, it is just as much a replacement as the laying of a mile of track, and the more promptly and frequently we make the small replacements generally called repairs or maintenance, the longer will be the life of the remainder of the property.

To assign a life to any piece of equipment without knowing the use and care to be given it is a somewhat puzzling proposition and the result must be unreliable in the extreme.

The use of these unreliable estimates of life of equipment to establish the amount upon which a company may earn reasonable returns by assuming that the age of the property has reduced its "Fair Value" from the cost or Gross Value in proportion to the part of the estimated life which has passed, is a reckless proceeding, and no doubt has frequently resulted in grave injustice, but nevertheless, it can be conclusively demonstrated that under certain conditions the use of theoretical depreciation, no matter how erroneous the estimate of life, will not result in injustice either to the investor or the consumer, and it can be just as conclusively demonstrated that under certain other conditions *any* depreciation to arrive at Fair Value will be unjust. However, before attempting to demonstrate these conclusions it is probably well to bring out certain truths in regard to depreciation calculations based on estimated life.

NOTE—Cost and Gross Value as used herein are not necessarily used as synonyms. This would depend upon whether or not the valuator uses the Original Cost Theory or some other Theory of Valuation.

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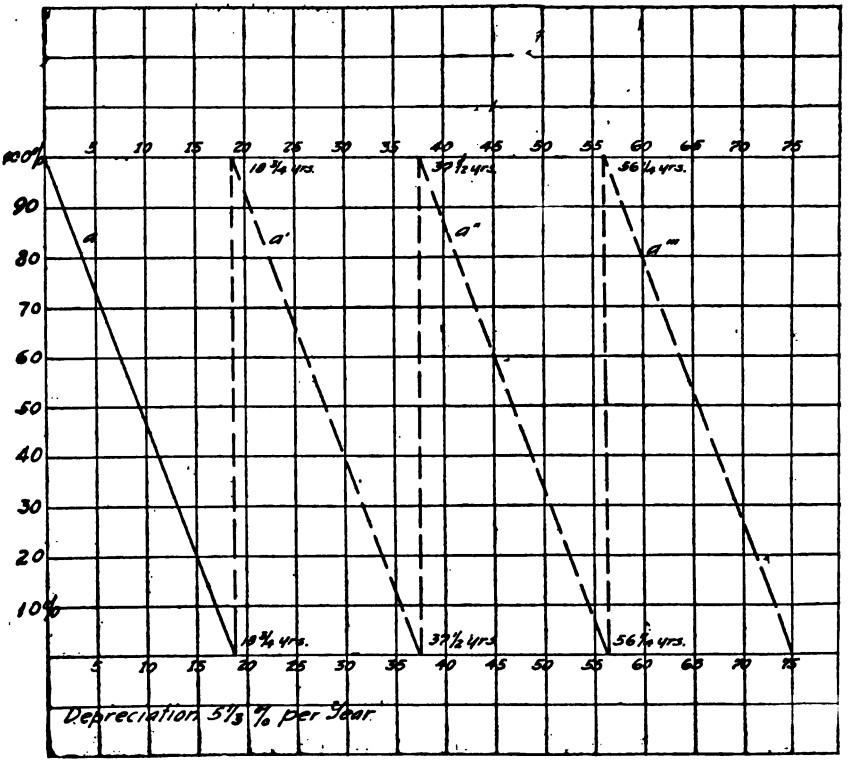

Figure 2.

The line a. represents one item of equipment with a life of 18¾ years. The broken lines a' a'' a''' represent successive renewals of a. Years are indicated by figures in horizontal lines at top and bottom of diagram.

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PART III.

NORMAL VALUE.

The study of the value curves produced by the application of the Remainder of Life or Average Life theory of depreciaiton brings out some conclusions or provable theorems which have a very direct bearing upon the problem of when it is right and just to depreciate a property to obtain Fair Value in a rate case, and when it is not.

In the Curves used as illustration the Straight Line method is used, but practically similar general results would be obtained with the Sinking Fund method or even with the Diminishing Value method.

Nearly every one who has not given special thought to the real effect of Theoretical Depreciation is apt to think of the composite life and value of a property as illustrated by the value line shown in Fig. 2, i. e., as beginning at 100% and ending at 0% (For simplicity, scrap value is omitted). This is the life curve of one item of equipment, and might even represent the composite life curve of a very small private plant consisting of very few items, but such a curve as Fig. 2 does not at all represent even the smallest public service property.

It has been a common mistake to assume that the composite life of a property is represented by that period of years in which the annual depreciation charges will sum up to the amount of the original investment. For instance, it is assumed if the annual depreciation charge arising from the composite of the different items amounts to $5\text{-}^1/_3\%$ as in Figs. 3 and 4, that the composite life of the property would be $100 \div 5^1/_3 = 18\frac{3}{4}$ years, and that the full depreciation fund would be needed at the end of that period.

As a matter of fact the composite value curve of even the simplest property does not follow a straight line from 100% to 0% owing to the necessity of renewing parts of the property when they are worn out, and not allowing their value to disappear from the plant. If the parts were not so renewed then

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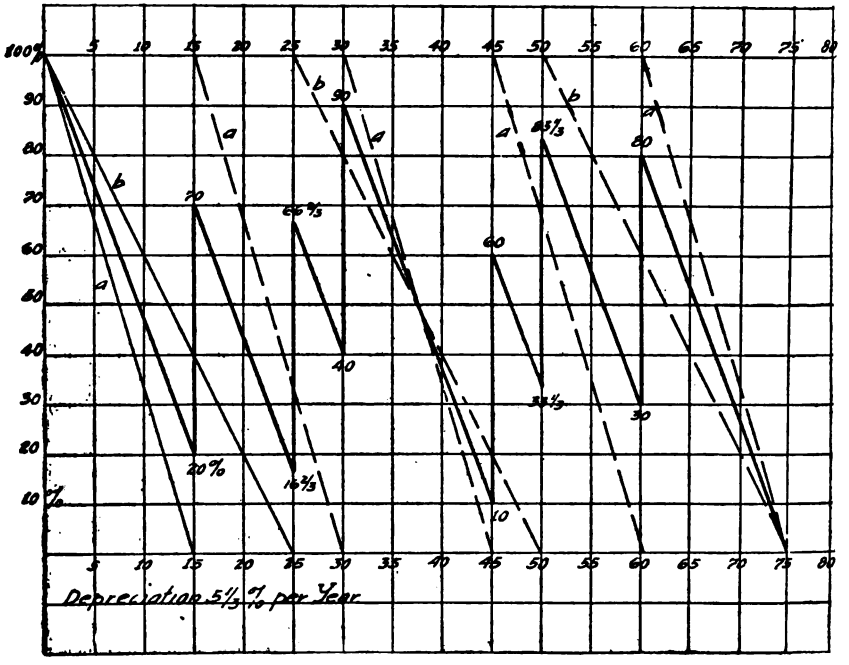

Figure 3.

The lines a. and b. represent installations of equipment having lives of 15 and 25 years respectively. The broken lines represent renewals of a. and b. The heavy line represents the composite value curve of a. and b. Figures at top and bottom of diagram are years.

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the life of the plant would cease the first time a vital part went out of use and was not renewed.

As stated before, Fig. 2, (a straight 100% to 0% curve) may be correctly assumed to represent the value curve of one item of equipment such as a boiler, engine or generator, but instead of contemplating only one item or assuming that a composite value curve is similar to that of one item, we must recognize that a public service plant is made up of many items with different estimated lives and that these items are seldom if ever installed all at the same time.

In Fig. 3 we have the combined or composite value curve of a supposed illustrative plant made up of only two items (a. and b.) both installed at the same time, of equal cost, but one of them (a) having an estimated life of 15 years while the other (b) has an estimated life of 25 years.

A study of Fig. 3 as compared with Fig. 2 shows what a marked effect is produced in a theoretical value curve by the fact that the investment is made up of two items of different estimated lives instead of but one item. Fig. 3 shows that when more than one estimated life enters into a property, the composite value line will not reach zero until a period of years has passed equal to the least common multiple of the different estimated lives, and until the end of such period the value line, considering all renewals, will not rise to 100%, nor fall to zero. In the simple case illustrated in Fig. 3 where only two lives are used (15 years and 25 years) it is seen that the value curve cannot reach zero for seventy-five years, and that therefore for seventy-five years there can be no need of the full accumulation of the depreciation fund, although it has been drawn upon as needed for renewals.

In Fig. 4 we have the same simple illustrative property composed of the two equal items a. and b. installed at the beginning of the plant, but we now assume that after ten years of existence the plant is increased by the addition of two items c. and d. respectively equal in amount and estimated life to a. and b., i. e., the plant is doubled but no new estimated lives are introduced, c. having a 15 year life equal to a. and d. having a 25 year life equal to b. The only new element introduced into the plant is that the items are not as in Fig. 3, all installed at the same time.

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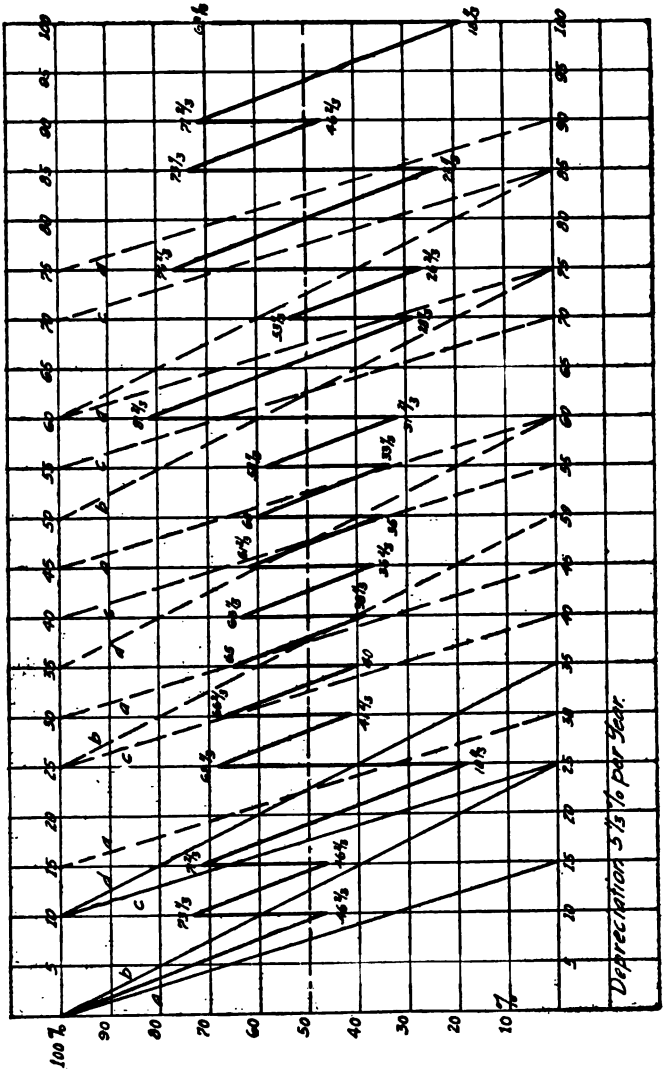

Figure 4.

Lines a. b. c. and d. represent installations of equipment. Broken lines represent renewals of a. b. c. and d. The heavy line represents the composite value curve of a. b. c. and d. Figures at top and bottom of diagram are years.

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Notwithstanding that we are keeping the elements as simple as possible, we can see from a study of Fig. 4 what a marked effect upon the value curve is produced by the simple fact that all of the plant is not installed at the same time. It is seen that the curve shows a marked tendency to flatten out and not to depart from the 50% line so widely as in Fig. 3, just as Fig. 3 shows the same tendency as compared with Fig. 2. It is also seen that now that items of the same life are installed at different times the curve will *never* reach zero, but instead will follow exactly similar "cycles" reduplicating themselves with every period corresponding to the least common multiple of all the different "lives." This is evident from a study of the curve from the 10 year ordinate to the 85 year ordinate (75 years is the cycle and least common multiple), and observing that from there on, it begins to reduplicate itself. It is evident that in a curve containing a number of different lives this cycle will be so long as to have no practical effect.

The importance of the study of Figs. 3 and 4 is to show, 1st: That as complexities or varieties of life and time of installation are introduced the value curve will hug closer to the normal or 50% line, and 2nd: That as soon as items of similar lives are installed at different periods there can be no such thing as the theoretical value *ever* descending to zero.

It should not be necessary to introduce further intermediate diagrams of more complexity to prove that by the working of these laws in a property built up of items of many estimated lives and installed piece meal, the theoretical value curve will eventually assume approximately the shape as shown in Fig. 5 beyond the 20 year ordinate or the time at which the first renewals commence.

It is true that there is a faintly possible chance that the arrangement of the different individual lives of items might so fall as to occasionally by convergence produce an accumulation of renewals at one point, but the law of probabilities and every effort of management would tend to prevent it in actual operation.

In Fig. 5 it is seen that the Normal Value Line is not a 50% but at 55%. This is caused by the introduction of the factor of scrap value, which is placed in this diagram at 10%. The

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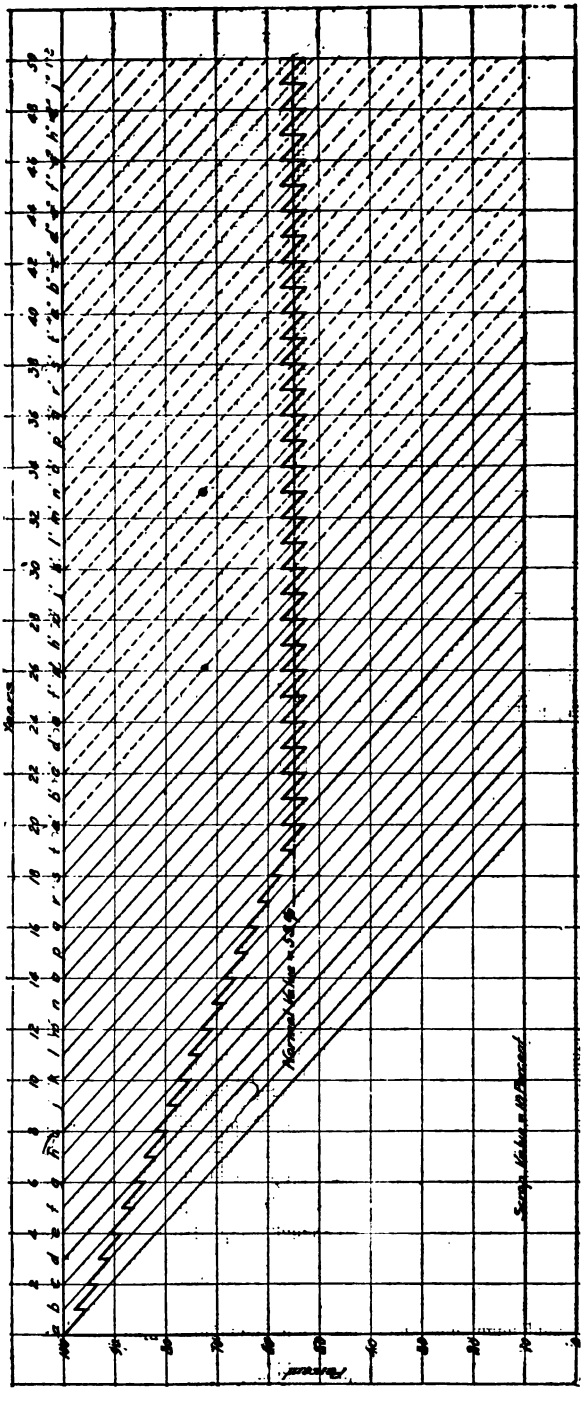

Figure 5.

Lines a to t. represent equal annual installments of equipments. Broken lines a' to t', etc., represent renewals.

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Normal Value Line in Straight Line depreciation is always half way between the scrap value line and 100%.

Fig. 6 is the theoretical value curve of an actual property, viz.: that of the United Railways Co., of St. Louis, and it can be seen at a glance how closely it compares to the results shown in the ideal curve in Fig. 5. The curve of the United Railways Company's property is the composite of all the value curves made up on the different forms of depreciable property owned by that company. The details of the value curves from which it is made up are shown in the appendix to this report. It can readily be understood that there will be a constant tendency to make the curve conform still more closely to the Normal Value Line by the efforts of good management to make replacements as even as possible each year; provided such a result is not prevented by expenditures connected with the financing rather than with the operation of the road.

It has been the purpose of the writer to show by diagrams that piece-meal built properties of any complexity will eventually assume a theoretical value curve closely conforming to the straight Normal Value Line half way between 100% and the composite scrap value of the property. To those who have some familiarity with the scientific side of the study of averages it will be evident without diagrams that the working of the laws of probability and averages will lead directly to the conclusion that a large property composed of many different items installed at many different times, will eventually as the items are renewed from time to time, settle down to an average age of approximately 50%. Granting the average age to remain at approximately 50%, it follows as a matter of course that the application of the straight line depreciation theory will bring a theoretical value of 50% of the wearing value or a permanent theoretical value at the Normal Value line as defined above, i. e., half way between 100% and scrap value. Practically the same conclusions are used in supporting the so-called 50% method of depreciation which has sometimes been applied to such parts of properties as pole lines, ties, etc., composed of a large number of similar units. The conclusions to be drawn from the ideal diagrams (Figs. 3, 4 and 5) and a study of the composite curve of an actual property (Fig. 6) and the detail curves from which Fig. 6 is made up would show that after a

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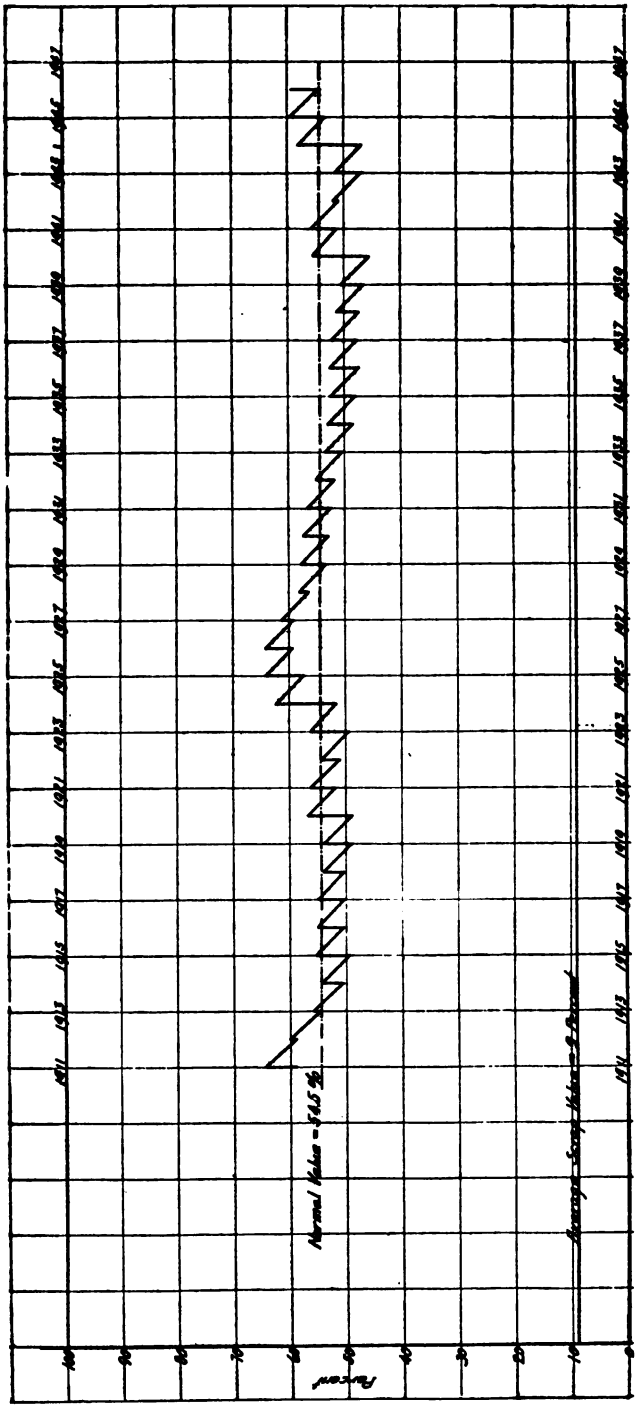

Figure 6.

Total Composite Theoretical Value Curve of the depreciable property of the United Railways Co., of St. Louis.

This same curve is reproduced in the appendix as Fig. 1,

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large property is once "seasoned" the 50% method will apply to the whole of it. It should be held in mind, however, that while the writer is attempting to show that approximately a constant 50% theoretical value is the logical result of the Remainder of Life or Average Life method of depreciating, nevertheless, as will appear later in this report, he is not contending that such a method can be justly applied in public valuations.

The contention made here is simply that large properties have what may be called a Normal Theoretical Value which in the Straight Line method is approximately half way between 100% and scrap, and it is evident that if the life of each item of equipment is assumed to end when it begins to give poor service to the public then this Normal Theoretical Value Line will represent that condition of the property where good service can be given with the greatest economy when investment charges, depreciation charges and operating charges are all considered.

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PART IV.

ACCUMULATION OF A NEEDLESS DEPRECIATION FUND.

A study of any theoretical depreciation curve will show that if the Theoretical Depreciation charges have been made from the installation of each item the accumulation in the depreciation fund will always equal the amount of depreciation, i. e., the sum of the depreciated value, and the accumulated fund will always equal the original investment, and when on account of the straightening out of the curve along the Normal Value Line there ceases to be any wide fluctuations for large renewal at any one time, then a great part of the fund will be a needless accumulation, as it can never be used for replacement or renewal. This can best be illustrated by referring to Fig. 5. During the period before the 20th year there has accumulated a fund equal to the part of the ordinate above the value curve. As the value curve straightens out the established depreciation charges are sufficient to take care of the yearly renewals and all of this fund is left undisturbed. This is worked out in Table A, which shows in detail the state of the depreciation fund, the amount of investment and the theoretical value for each year of the ideal property diagramed in Fig. 5. Each item of investment, a. b. c. d., etc., etc., is assumed to be $1,000. The same results as to the relation of the fund to the curve will appear if any of the other curves are worked out and tabulated.

As an interesting corollary to the principles shown in Parts III and IV it appears in properties such as will be approximately represented by Fig. 5 that as there is no need of setting aside depreciation charges during the first part of the life of equipment, it follows that with the same net earnings there is an extra profit during the period before the Normal Value Line is reached, nor can the depreciation charges necessary after the normal period is reached be apportioned over the whole life of the items from their installation, for the curve after conforming to the Normal Value goes on indefinitely. There can be made, however, some very interesting deductions as to when in the life of an item of equipment the depreciation charges should commence. But these points not being directly germain to the present purpose, will be reserved for discussion in another report.

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TABLE A.

Amount of Each Item of Investment, a, b, c, d, etc	$1000.00
Scrap Value	10%
Wearing Value, each item	90%
Life each item	20 Years
Annual depreciation	4½%
Annual depreciation charge, each item	45.00

YEAR.	Annual Depreciation Charges.	Amount in Depreciation Fund.	Percent of Investment in Depreciation Fund.	Amount in Depreciation Fund After Renewal.	Percent of Investment in Depreciation Fund After Renewal.	Depreciated Value.	Depreciated Value Percent of Investment.	Depreciated Value After Renewal.	Depreciated Value After Renewal Percent of Investment.	Investment.
1	$ 45	$ 45	4.5 %			$ 955	95.5 %			$1000
2	90	135	6,7 %			1865	93.3 %			2000
3	135	270	9.0 %			2730	91.0 %			3000
4	180	450	11.2 %			3550	88.8 %			4000
5	225	675	13.5 %			4325	86.5 %			5000
6	270	945	15.7 %			5055	84.3 %			6000
7	315	1260	18.0 %			5740	82.0 %			7000
8	360	1620	20.2 %			6380	79.8 %			8000
9	405	2025	22.5 %			6975	77.5 %			9000
10	450	2475	24.7 %			7525	75.3 %			10000
11	495	2970	27.0 %			8030	73.0 %			11000
12	540	3510	29.2 %			8490	70.8 %			12000
13	585	4095	31.5 %			8905	68.5 %			13000
14	630	4725	33.7 %			9275	66.3 %			14000
15	675	5400	36.0 %			9600	64.0 %			15000
16	720	6120	38.3 %			9880	61.7 %			16000
17	765	6885	40.5 %			10115	59.5 %			17000
18	810	7695	42.7 %			10305	57.3 %			18000
19	855	8550	45.0 %			10450	55.0 %			19000
20	900	9450	47.25%	$8550	42.75%	10550	52.75%	$11450	57.25 %	20000
21*	900	9450	47.25%	8550	42.75%	10550	52.75%	11450	57.25 %	20000
22	900	9450	47.25%	8550	42.75%	10550	52.75%	11450	57.25 %	20000
23	900	9450	47.25%	8550	42.75%	10550	52.75%	11450	57.25 %	20000
24	900	9450	47.25%	8550	42.75%	10550	52.75%	11450	57.25 %	20000
25	900	9450	47.25%	8550	42.75%	10550	52.75%	11450	57.25 %	20000

*After Twenty Years these figures repeat themselves indefinitely.

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PART V.

CONCLUSIONS.

Parts III and IV bring out three provable theorems as true of theoretical value based upon estimated life.

Theorem One: In Theoretical Depreciation there is a Normal Value toward which a large property is constantly tending, and which if the life of the equipment is correctly estimated, will represent that condition at which the property will give good service at least cost, considering investment charges, depreciation charges and operation charges.

Theorem Two: If a Theoretical Depreciation charge has been set aside from the beginning of the property, the amount in the fund at any time will equal the amount of the depreciation, and the sum of the fund and the remaining theoretical value will equal the original investment.

Theorem Three: In a property where items of similar life have been installed at different periods, there can never be a need for all of the fund which has been accumulated from Theoretical Depreciation charges made from the installation of the property, i. e., a part of the fund will be useless, so far as renewals are concerned.

The most important fact, however, which develops as a corollary to Theorem One is that if we assume, as we ought, that the life of a piece of equipment ends when it begins to give poor service to the public, then we see that the owners of the property have absolutely no way of raising the theoretical value of their property much above the Normal Value, or about 50% of their investment unless they throw away property which is giving satisfactory service to them and to the public. And in the further discussion of the problem it must be held in mind that the service rendered to the public by the property represented by the horizontal portion of the value curve, i. e., Normal Value,

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is assumed to be practically as good as when the property was new.

Referring to Fig. 5, let us assume (although by Theorem Three it would seem an entirely unnecessary thing to do, as the fund would be useless) that the consumer has paid legally established depreciation charges during the constructive period (up to 20 years) over and above a clearly ascertained reasonable return on the investment. It is evident then (Table A) that the consumer has returned to the investor 42.75% of the full investment, (Theorem Two) which sum is either in the pocket of the investor or in the fund. Under the circumstances it will appear perfectly just that the investors should continue to earn only upon the remaining 57.25% which they still retain in the business, or rather on the mean or Normal Value of 55%.

But now let us assume that the consumer did not pay a depreciation charge during the constructive period. Then it is clear that the investors have paid 100% to produce a property giving good service but having a Normal Theoretical Value of only 55% of their investment, and if the property is only to be allowed to earn on its theoretical remainder of value, 45% of the cost to produce it has been practically confiscated by the application of a theory.

No one can be so foolish as to assume that investors can construct or maintain a plant and equipment which will remain new and therefore as a plant and aside from earning power free from depreciation in Market Value, but they can maintain it so as to give a service practically as good as from a new plant. The fact is that they really pay their full investment in plant for the normal state of the plant at which it will continue to give good service, i. e., the investment is the real cost of a normal plant and the theoretical depreciation if deducted from the cost of the plant, might well be called a cost of establishing business, and therefore a legitimate part of Fair Value.

The whole question, so far as justice is concerned, is: Has the public paid back to the investors in excess of reasonable returns, a part of their investment equal to the estimated Theoretical Depreciation, and if so, has the public the legal and moral right to reclaim such excess profits once the company

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has been legally allowed to earn them, and provided the property is in good serviceable condition?

If in the past there has been a law or legal regulation limiting profits or establishing a depreciation fund on determined charges, then there could be no question that excess profits or the amount of the depreciation fund should be justly deducted from Gross Value in determining the Just Amount to be earned on, and it will in any case *be perfectly proper to make such deduction in the future,* after depreciation charges are established. But if we grant that there has been no such law or regulation, and that the owners of the property could with reason, assume that their profits were not limited and that they were not legally bound to provide a depreciation fund beyond their needs (Theorem Three) then the justice of penalizing them by an ex post facto regulation for acts not contrary to their rights, would seem of doubtful morality, to say the least.

It would seem from the foregoing, that if we are seeking a "Just Amount" upon which to base returns, a property which is rendering good service cannot justly be depreciated unless it can be shown that the investors have been reimbursed for the depreciation by legally established depreciation charges or by illegal excess of profits in the past.

The foregoing conclusions are predicated upon the assumption that the company is rendering good service to the public, and the question presents itself as to what would be the effect of the company allowing its service to deteriorate, and also the question as to what should be the standard of service in each particular case.

It would seem that the standard of good service should be based first, upon the assumption that the physical equipment is in a state of efficiency, and second, that enough money is being efficiently spent in operation to give a service which will leave only a reasonable profit to the owners of the property. It is evident that if the latter assumption is correct the standard of service will be an elastic one and will vary with the net earnings of the property or with the rates paid by the public and the amount of patronage. In other words, the public should pay for what it gets and should get what it pays for.

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For the purpose of this report, however, it is not necessary to consider the effects of operating expenses on service. The question here is: What should be the effect upon the "Just Amount" to be earned on, of a condition of inefficiency in physical equipment?

An obvious way to deal with the problem would be to determine how much money it would require to place the property in efficient condition, and to deduct that amount from the amount upon which returns are based, but a little study of the plan shows that the replacements or improvements required to render a property efficient might be an insignificant portion of the investment, but yet a lack of them cause a very great deterioration in the service to the consumers, and to depreciate a property on this plan would not, in many cases, produce a penalty adequate for the prevention or correction of poor service. What is needed is a severe penalty and not merely an adjudication of the value of investment.

A deduction from the valuation could not be claimed to be unjust to the company, but once it is made it can be used as a justification of the continuance of poor service, and is therefore not a good remedy. In short, poor service caused by dilapidated equipment should not be permitted, and when it does exist it should be corrected by compelling the owners to make the property efficient from their own pockets under such penalties as will make it distinctly for their interest to do so.

As a question of public service regulation, the authorities should be given the power and the duty to *prevent* the use of decrepid equipment rather than be called upon to consider such a condition as an element in rate making.

There are a number of quite feasible plans for governing service or penalizing poor service, which make it entirely unnecessary to consider the question as a matter affecting valuation of investment, and which being more direct in their effect are calculated to produce much quicker and better results. It is not, however, within the purpose of this report to consider regulation of service.

The generally accepted idea that the property in the service of the public must necessarily be depreciated from its cost in

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order to arrive at a "Fair Value" in a rate case seems to arise from the perhaps unconscious obtrusion of the idea of Market Value into the mental working of those officials who are really charged with the task, not of determining Market Value, but with the higher duty of administering justice. The question, what is the property worth? is apt to have a powerful effect until one differentiates between Just Amount and Market Value, but once this differentiation is made it should be clear that Market Value is not the standard to use in deciding the amount upon which a public service company is entitled to earn reasonable returns.

If for any purpose a Market Value is required there may be a question that Gross Value or cost should be depreciated to arrive at present value, for it is plain that the Market Value of property whose life is partly gone, is less than that of similar new property under the same conditions as to gross income. But if we are seeking a Just Amount upon which to base the returns of a public service company, there are conditions where a deduction from Gross Value for estimated depreciation will result in practical confiscation of capital invested in good faith in the public service, and this is true whether the depreciation is calculated by the Average Life or by Observation or by any other method.

A review of this report would show that in dealing with a property giving good service, the Just Amount to be earned on should include the cost or Gross Value of the property efficiently serving the public at the time of the valuation, unless it can be shown that the public has reimbursed the owners of the property for the amount of the proposed depreciation.

In most valuations of public utilities we are dealing with a situation where there has been in the past no regulation of rates based upon a reasonable return, and where there has been no legal requirement of a depreciation fund.

It can be shown in the larger properties at least, that the accumulation of a depreciation fund on the basis of estimated life would have been a useless charge upon the consumer or upon the investor as the case may be. So, to assume arbitrarily that this theoretical fund should exist is equivalent to regulating the past

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profits of a company. It seems hardly probable if the case were presented to any court, as an ex post facto regulation of profits, that such regulation would be permitted. But after depreciation charges have been established by legal regulation and are paid by the consumer, then for the future, any accumulation which is or should be in the depreciation fund as the result of these charges is a repayment of investment by the consumer and should be deducted from Gross Value to determine the Just Amount upon which to base reasonable returns.

To make a final reiteration of the foregoing arguments, it is evident that:

The larger properties have an approximately constant Normal Theoretical Value at which the plant gives good service to the public.

To produce this Normal Value the cost of the property in the service of the public was 100% and the public cannot be served without devoting 100% to the service.

It is therefore just that the investors be rewarded by the public for the cost of the property in the service of the public unless it can be shown that they (the investors) have been paid back a part of their 100% by the public.

In the case of a heretofore unregulated property it cannot be shown that the company should have set aside depreciation charges to accumulate a fund equal to the Theoretical Depreciation, for such a fund would be needless.

If then we are to claim that the investors have been paid back the theoretical depreciation we must assume that such reimbursement has been made from excess profits over a legitimate return. Otherwise they have not been paid back.

A legitimate return was what the investors could make under the then existing laws and therefore there could be no excess over legitimate returns unless illegally made.

It might be claimed that a legitimate return was only a reasonable return, but such an argument is unsound and if admitted as a principle it leads inevitably and directly to the right to deprive people of property legally acquired in the past, merely because we now think their profits were too high.

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At bottom and when clearly analyzed, this is what deductions for depreciation often mean in public valuation.

In public service enterprises it frequently happens that there have been small or no profits, but even if they seem to have been large, to claim that the investors have been reimbursed for depreciation by excess profits in the past is to deprive them of a part of their legitimate past profits to create a needless depreciation fund and is equivalent to regulating profits in the past by enactments today. This is clearly in the nature of an ex post facto proceeding and should be inadmissible as a matter of law or as a matter of justice.

The conclusion seems clear then that in all ordinary cases of heretofore unregulated properties we cannot justly depreciate to obtain Fair Value unless we admit the justice of ex post facto laws or equivalent regulation, or unless we interpret Fair Value to mean Market Value and not Just Amount.

JAMES E. ALLISON,
Commissioner and Chief Engineer.

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APPENDIX

STUDIES OF THEORETICAL VALUE CURVES.

The curves shown in this appendix are with the exception of curves, Figs. 17, 18 and 19, made up from data taken from the property of the United Railways Co., of St. Louis. This road has followed the usual course of growth and consolidation common to the history of the street railways of most large American cities, and now consists of 461 miles of city and suburban track, operating or owning some 1,500 cars.

The main object in exhibiting these curves is to show that while many of the curves on different species of property fluctuate widely from the Normal Value Line, yet when they are all brought together in the composite total curve, Fig. 1, the operation of the law of averages and probabilities brings the theoretical value curve into remarkably close conformity with the Normal Value Line.

Each one of the separate curves has its percentage of weight in the composite curve in proportion to the percentage of the whole property represented by its class of equipment.

These curves are made up by making each diagonal full line represent an annual installation of equipment. The angle of the line represents the rate of depreciation and the value decreases to scrap at the end of the estimated life. The value of each installation is given weight in making up the value curve by using the percentage of the total investment represented by the installation as one factor and its depreciated value as another. The sum of the results of these two factors occurring on any ordinate gives the point of the value curve on that ordinate. Each original installation has a letter a. b. c., etc., to designate it, and the renewal of each installation is designated by a similar letter and a broken diagonal line. In most of the curves its per cent of value in the curve is given to each installation by small figures under the letters a. b. c., etc.

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The following table gives the percentage of value-weight of each class of equipment in the total composite curve, Fig. 1:

		Per Cent.
Fig. 1.	Total 100 Per Cent.	
Fig. 2.	City Track and Paving	30.2
Fig. 3.	County Track and Paving	4.5
Fig. 4.	City Special Work and Paving	5.5
Fig. 5.	County Special Work and Paving	0.8
Fig. 6.	Cars	24.7
Fig. 7.	Machine Shop Equipment	0.8
Fig. 8.	Mechanical and Electrical Equipment and Pipework	12.8
Fig. 9.	Storage Batteries	0.8
Fig. 10.	Buildings	10.0
Fig. 11.	Feeder Wire	5.4
Fig. 12.	Wood Poles	0.7
Fig. 13.	Iron Poles	1.7
Fig. 14.	Trolley Wire and Spans	1.4
Fig. 15.	Cable	0.6
Fig. 16.	Conduit	0.1
	Total	100.0

THE DIMINISHING VALUE METHOD OF DEPRECIATION.

Fig. 18 shows theoretical value curves worked out on the Diminishing Value method.

Taking the curve B. as an example we see that in the first year 10% of the whole value is set aside in a fund and the property correspondingly depreciated. In the second year 10% of the remaining 90% of the value is set aside and charged off, i. e., 9% of the whole. There is then remaining 81% of the whole and in the third year 10% of this or 8.1% of the whole is set aside and charged off, and so on ad infinitum. It is ad infinitum theoretically, for the curve will never reach zero, although constantly approaching it. The method is purely arbitrary and therefore of no great practical service in determining theoretical value. The only argument advanced for it is that the depreciation charges decrease as the maintenance charges may be expected to increase as the plant grows older. However, there is no connection between the expected increase of maintenance and the arbitrarily decreased depreciation charges.

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To offset any supposed advantage from chance balancing of maintenance and depreciation is the evident fact that to have a fund ready for renewals very heavy charges for depreciation must be made at the beginning of a business when the enterprise is least able to stand them.

Fig. 17 shows a Normal Value curve worked out on the Diminishing Value method. In order to make the curve it was necessary to draw the curve of each installation on the basis of no scrap value and assume a renewal when the curve crossed the scrap value line, otherwise we would have the absurdity of a plant made up of parts never needing renewal but of constantly diminishing value.

It will be noticed that the Diminishing Value method gives a low Normal Value, and that Normal Value is not by this method half way between 100% and scrap, as it is in the Straight Line method.

NORMAL VALUE, SINKING FUND METHOD.

Fig. 19 shows a Normal Value curve made up from the application of curves based on the Sinking Fund method at 4% compound interest.

It will be noticed that this method gives a high Normal Value, and not half way between 100% and scrap, as in the Straight Line method. It is evident that the Straight Line method gives the rational position of the Normal Value.

JAMES E. ALLISON,
Commissioner and Chief Engineer.

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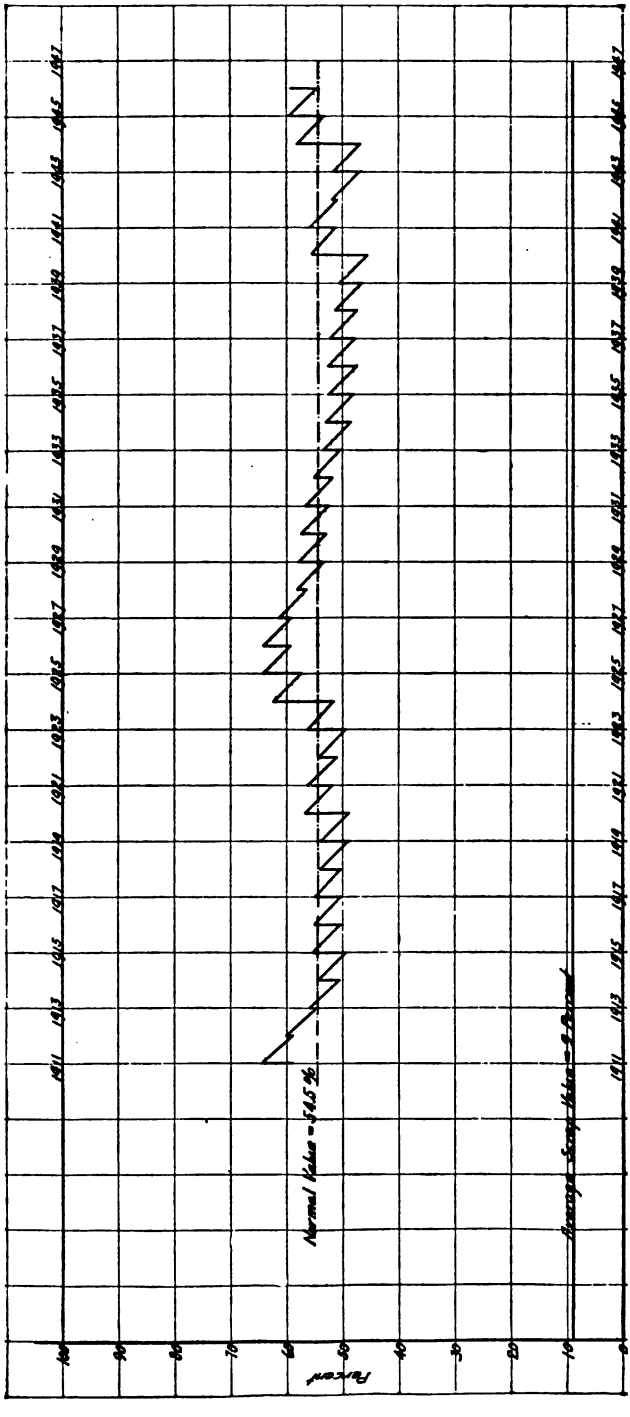

Figure 1.—Also used as Figure 6 in Text.
Composite Total Theoretical Value Curve of the property of United Railways Co., of St. Louis.

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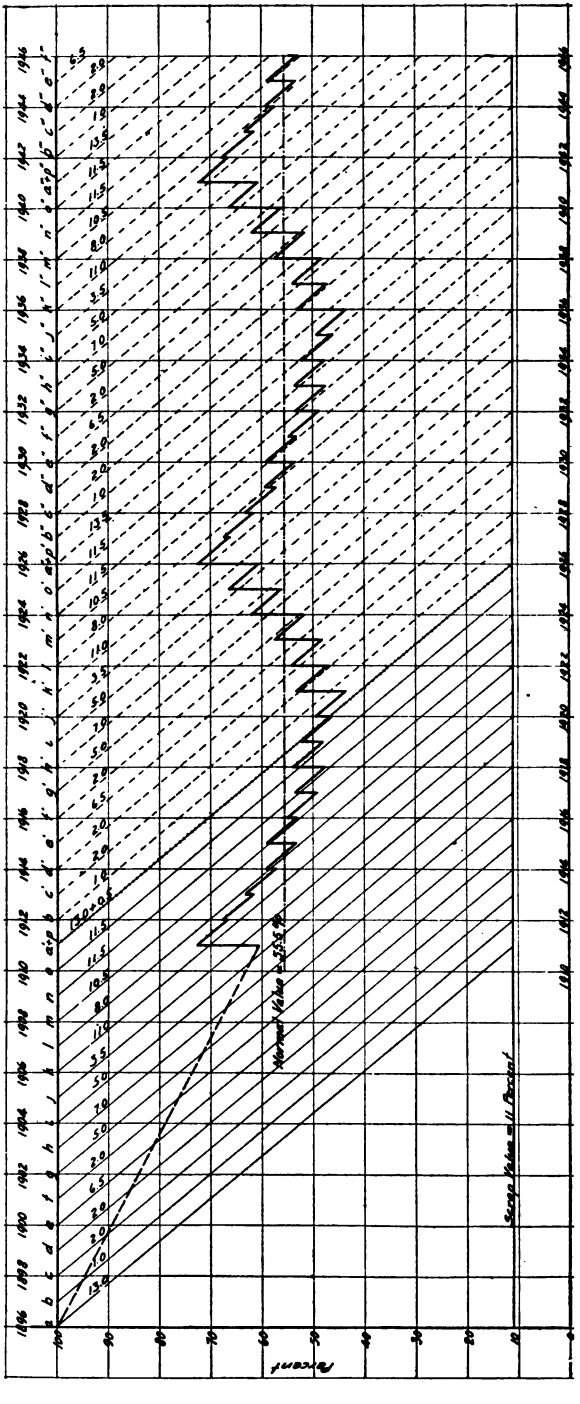

Figure 2.

Theoretical Value Curve. City Straight Tracks and Paving.
United Railway Co., St. Louis.
30.2% of Total.

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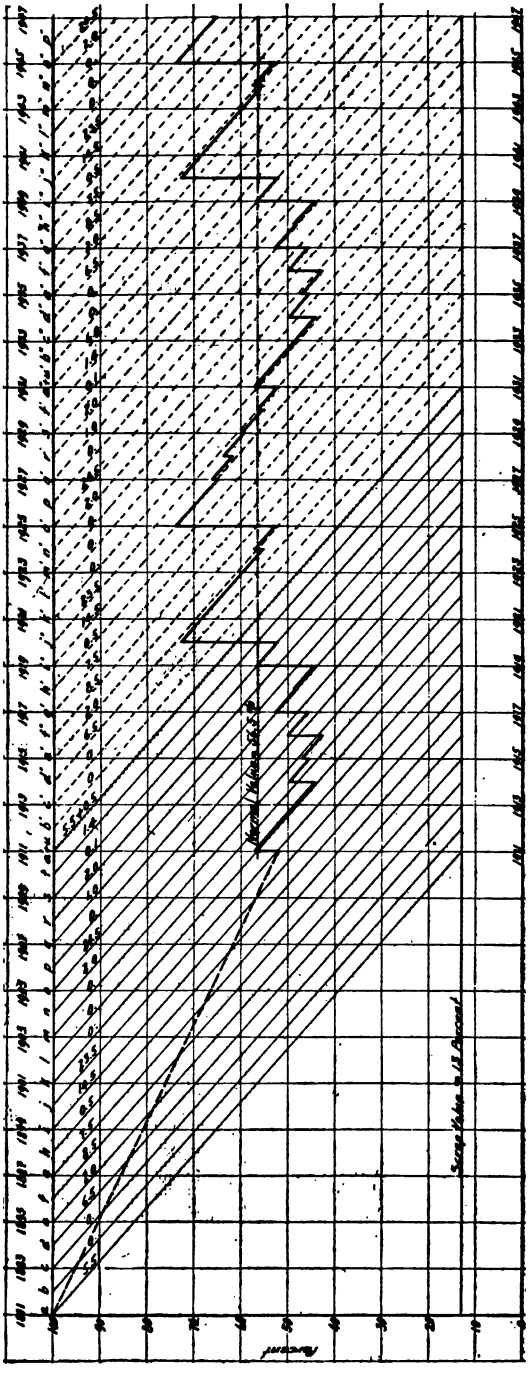

Figure 3.

Theoretical Value Curve. County Straight Track and Paving.
United Railway Co., St. Louis.
4.5% of Total.

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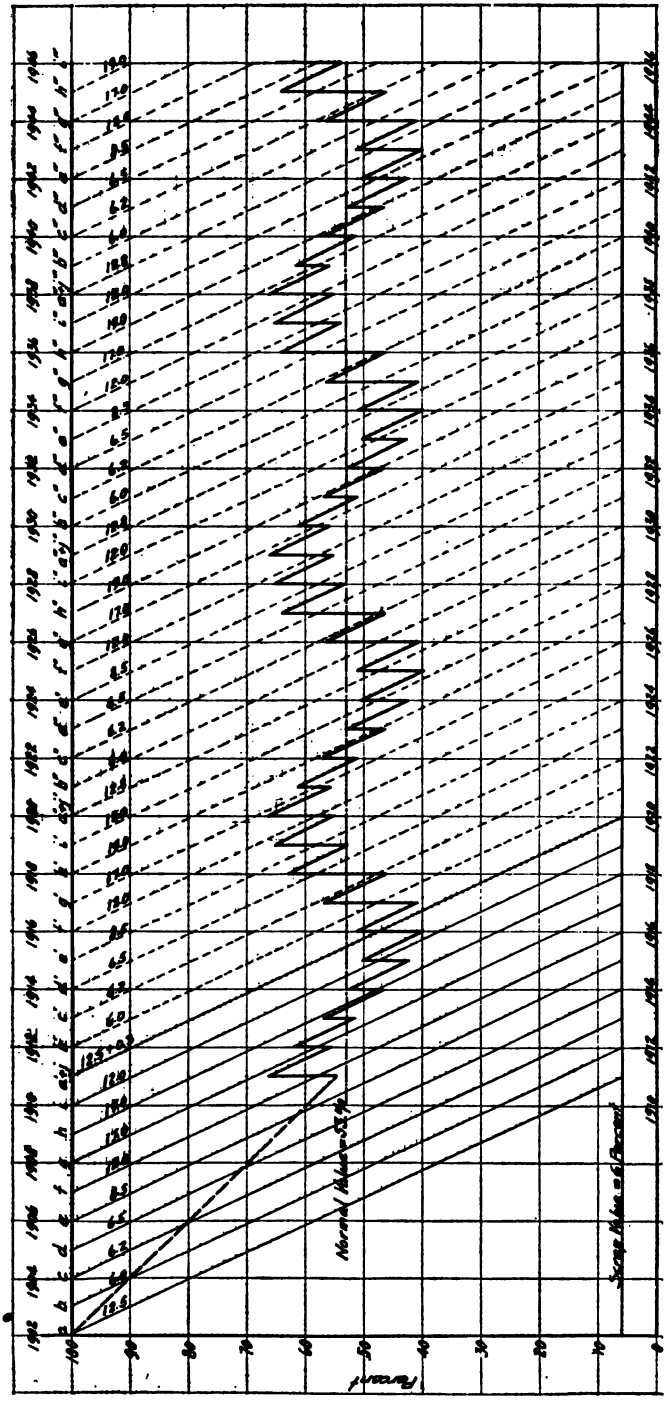

Figure 4.

Theoretical Value Curve. City Special—Work and Paving.
United Railway Co., St. Louis.
5.5% of Total.

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Figure 3.

Theoretical Value Curve. County Straight Track—Work and Paving.
United Railway Co., St. Louis.
4.5% of Total.

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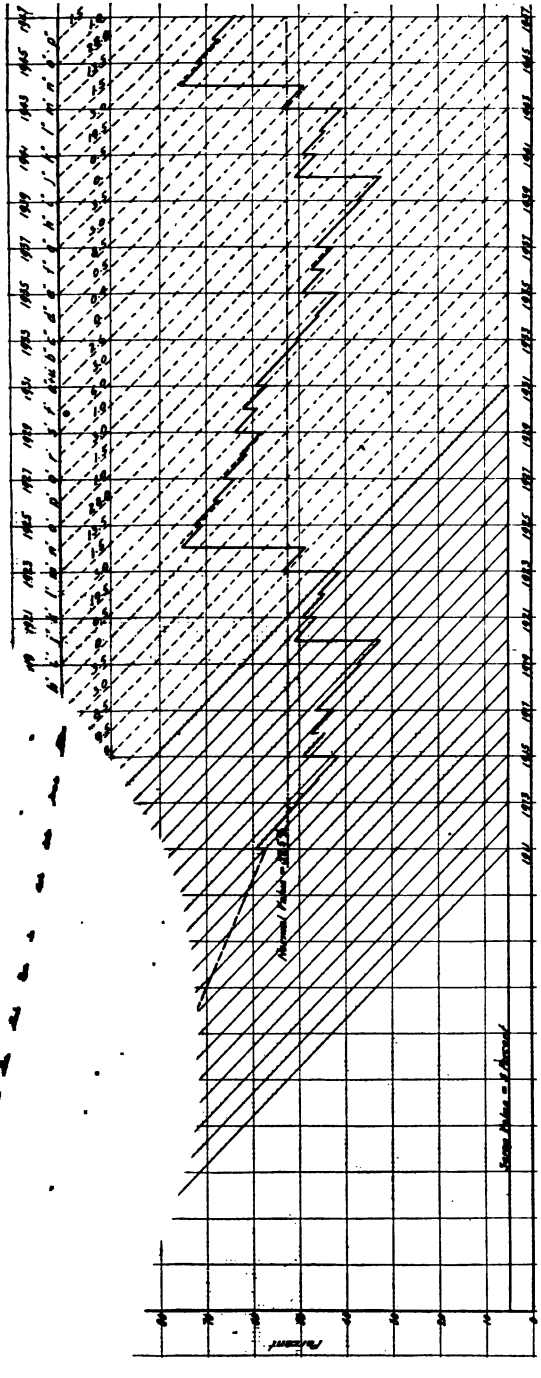

Figure 6.
Theoretical Value Curve of Cars.
United Railway Co., St. Louis.
24.7% of Total.

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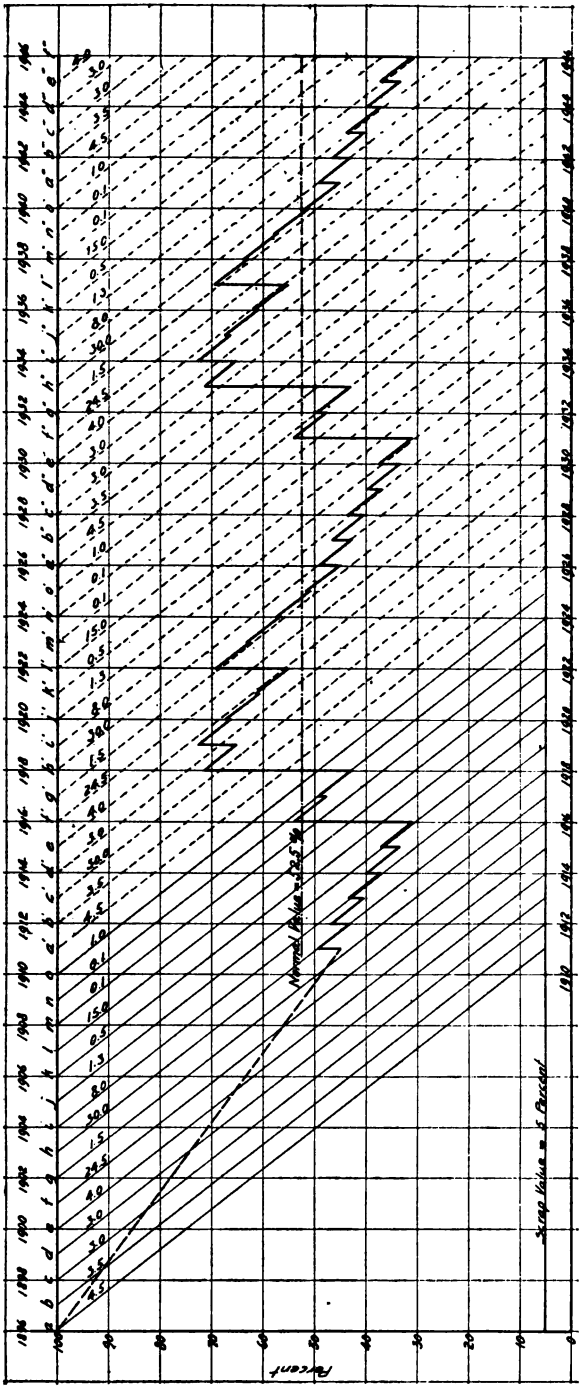

Figure 7.
Theoretical Value Curve. Machine-shop Equipment.
United Railway Co., St. Louis.
0.8% of Total.

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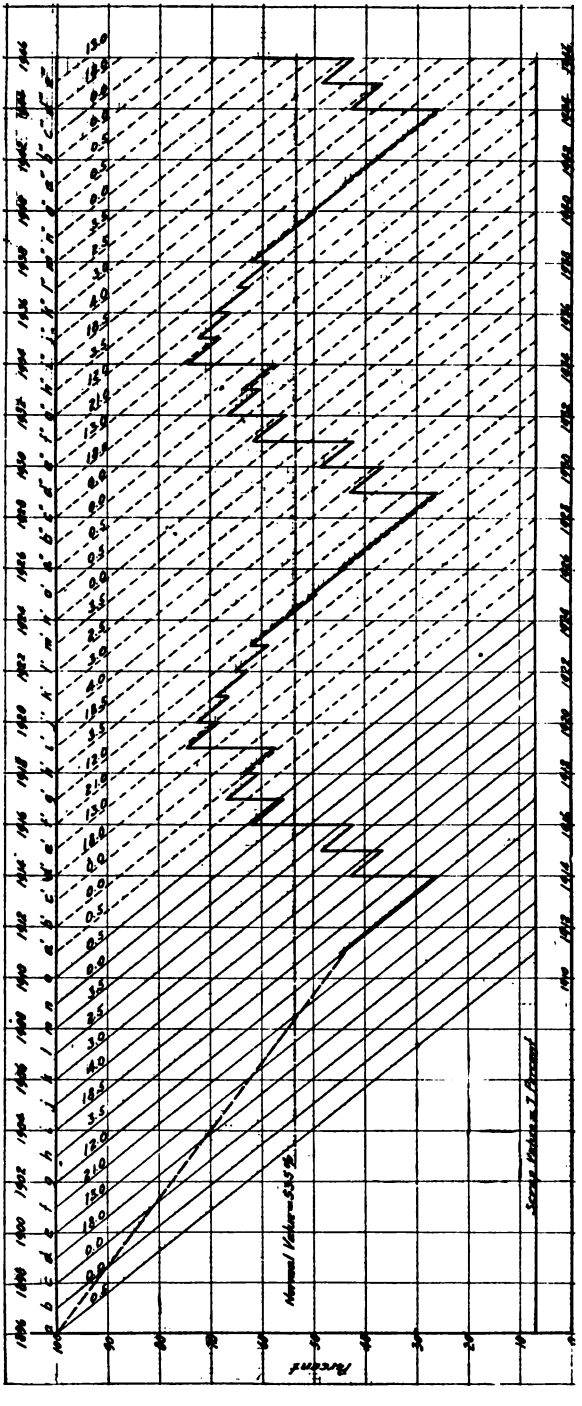

Figure 8.

Theoretical Value Curve. Mechanical and Electrical Equipment.
United Railway Co., St. Louis.
12.8% of Total.

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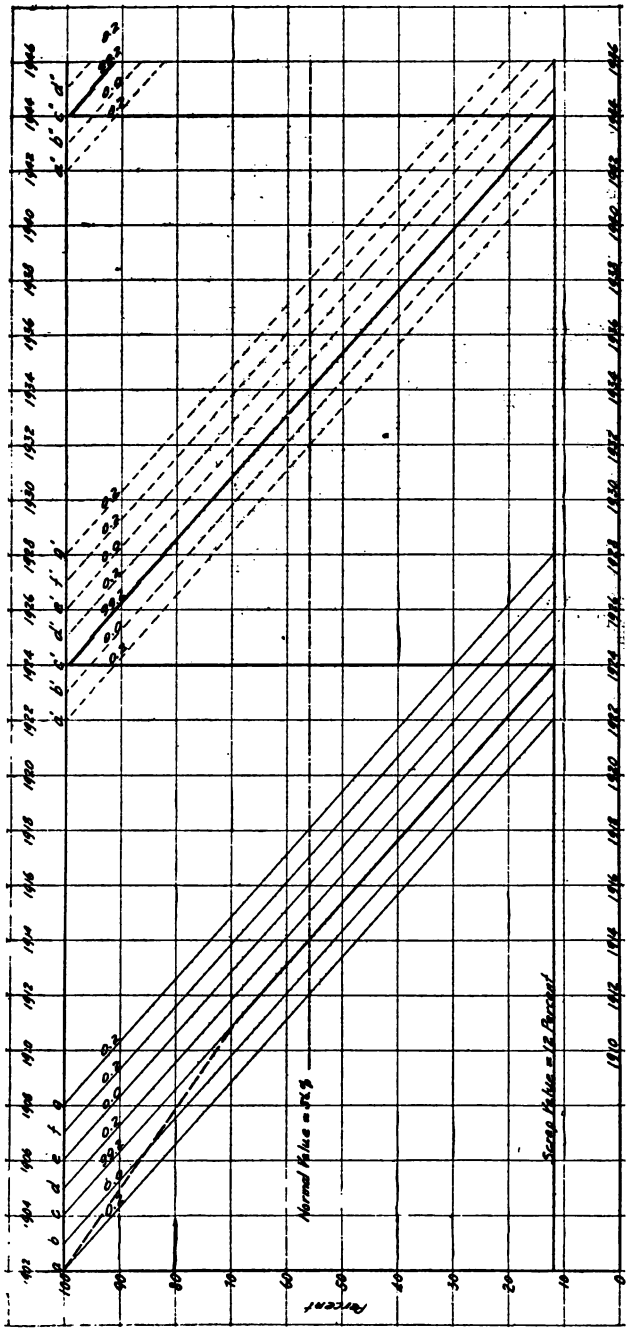

Figure 9.
Theoretical Value Curve. Storage Batteries.
United Railway Co., St. Louis.
0.8% of Total.

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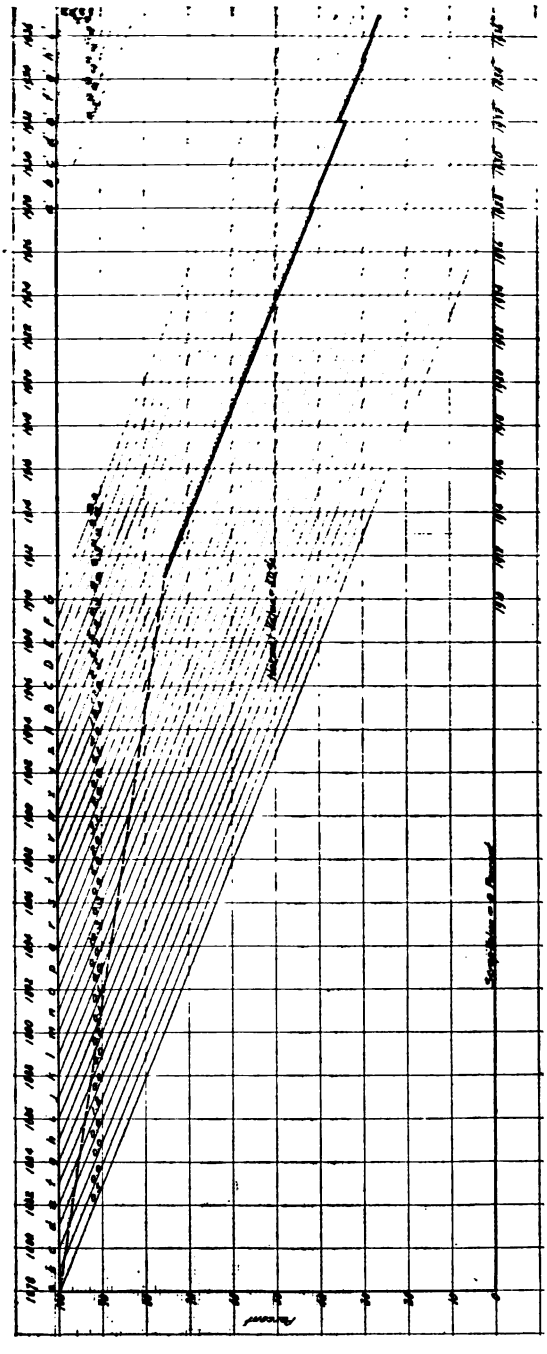

Figure 10.
Theoretical Value Curve. Buildings.
United Railway Co., St. Louis.
10% of Total.

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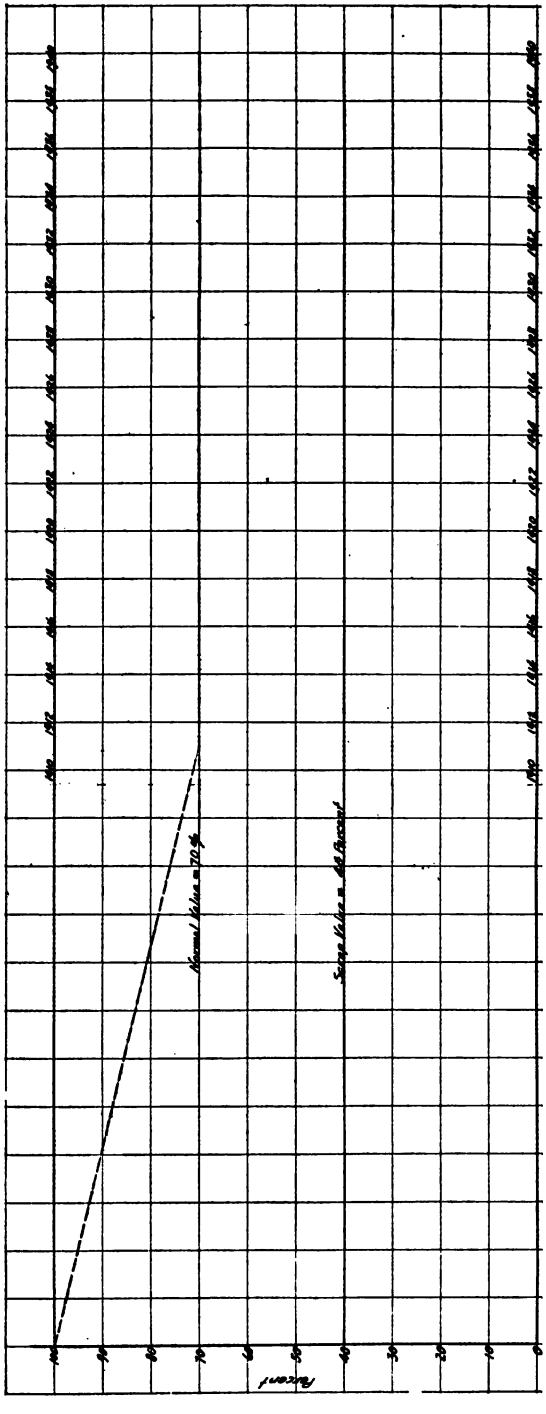

Figure 11.

Theoretical Value Curve. Feeder-Wires.
United Railway Co., St. Louis.
5.4% of Total.
No data as to age available. Normal value assumed.

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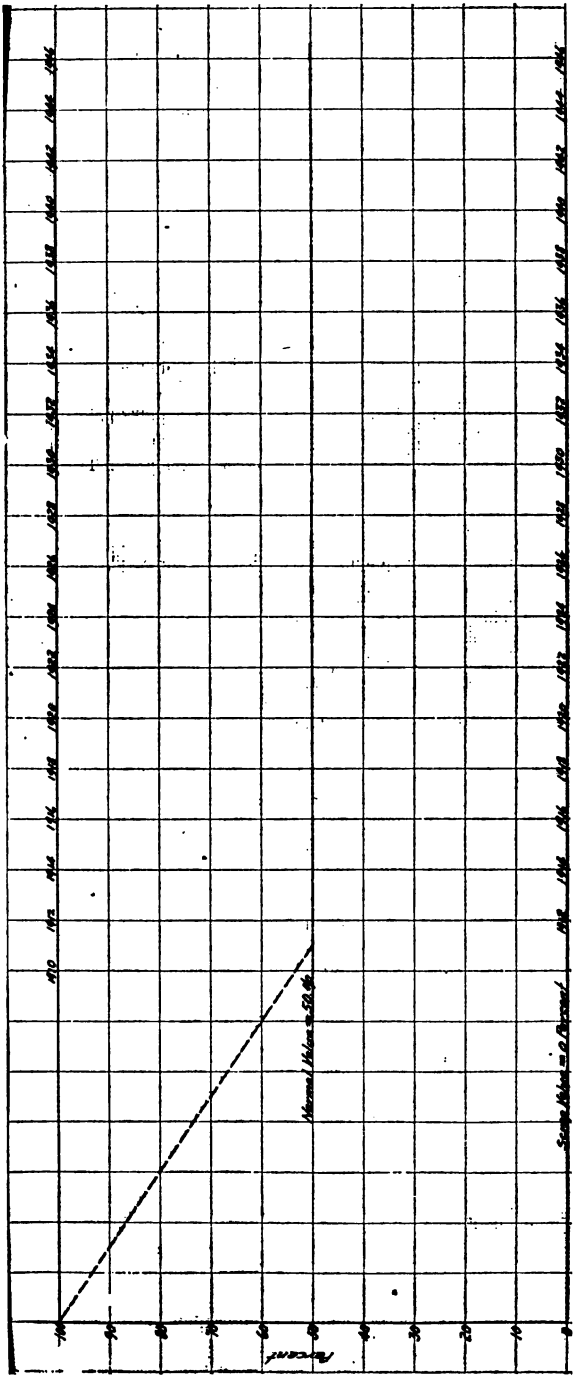

Figure 12.

Theoretical Value Curve. Wood Poles.
United Railway Co., St. Louis.
0.7% of Total.
No data as to age available. Normal value assumed.

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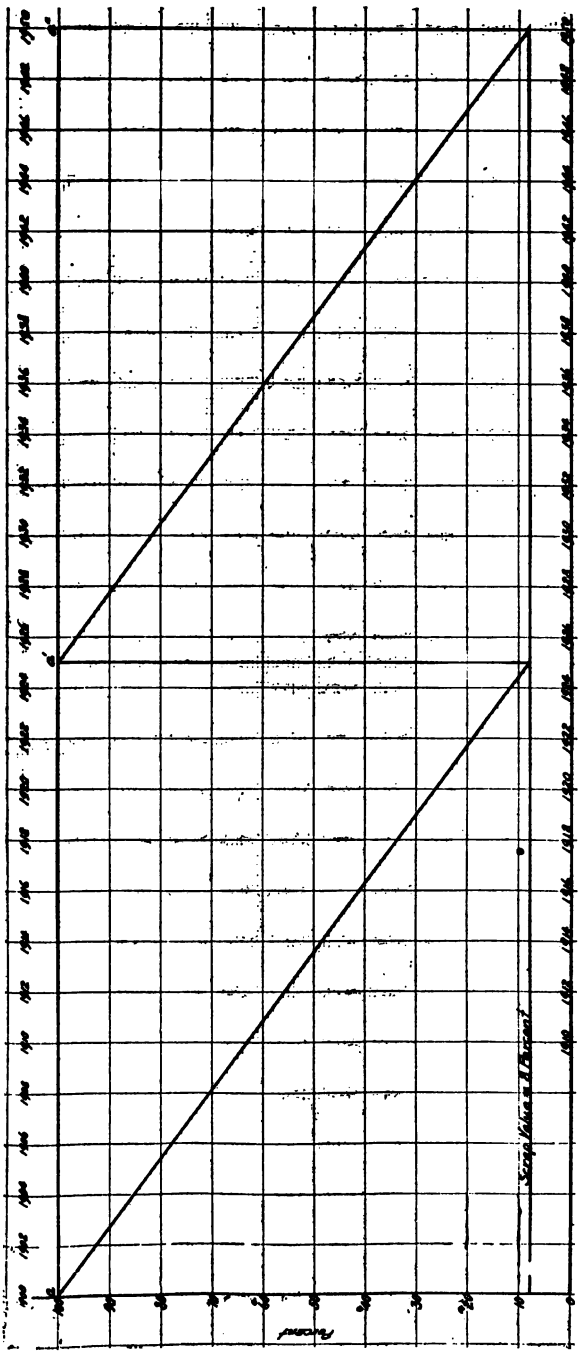

Figure 13.

Theoretical Value Curve. Iron Poles.
United Railway Co., St. Louis.
1.7% of Total.
All Iron Poles installed at approximately same period.

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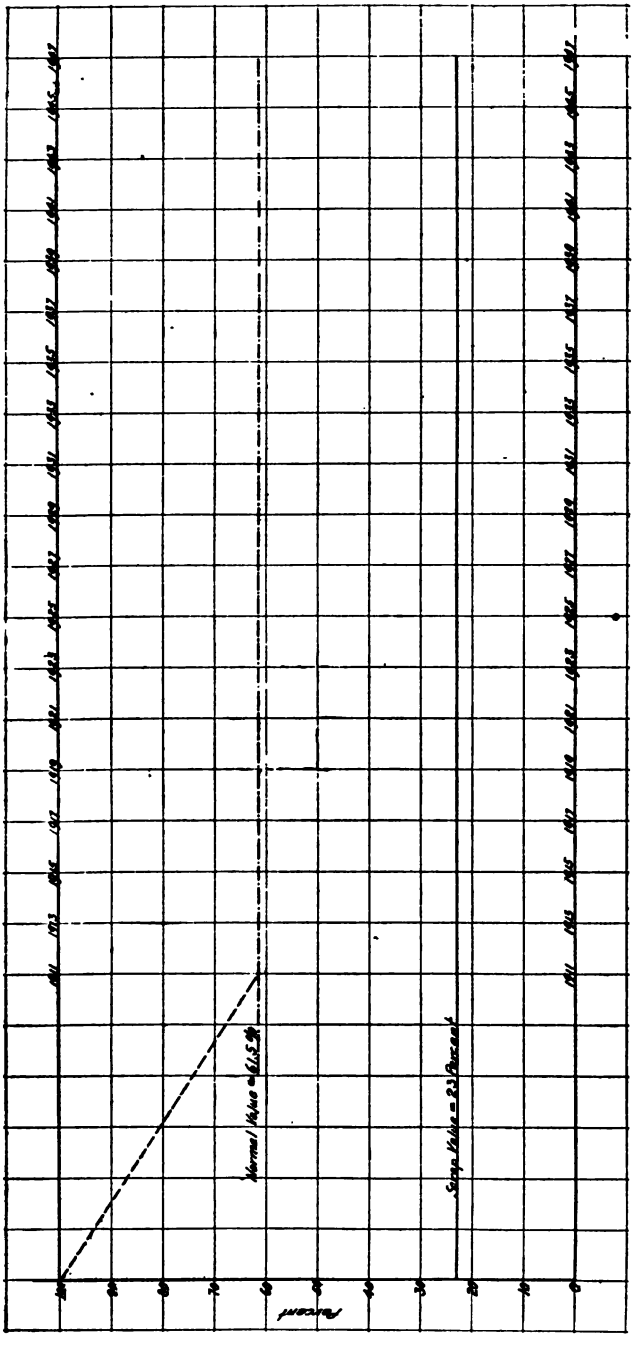

Figure 14.

Trolley Wire and Spans.

No data as to age available. Normal value assumed.

Actual measurements by caliper over the whole system shows assumption of normal value to be correct.

1.4% of Total.

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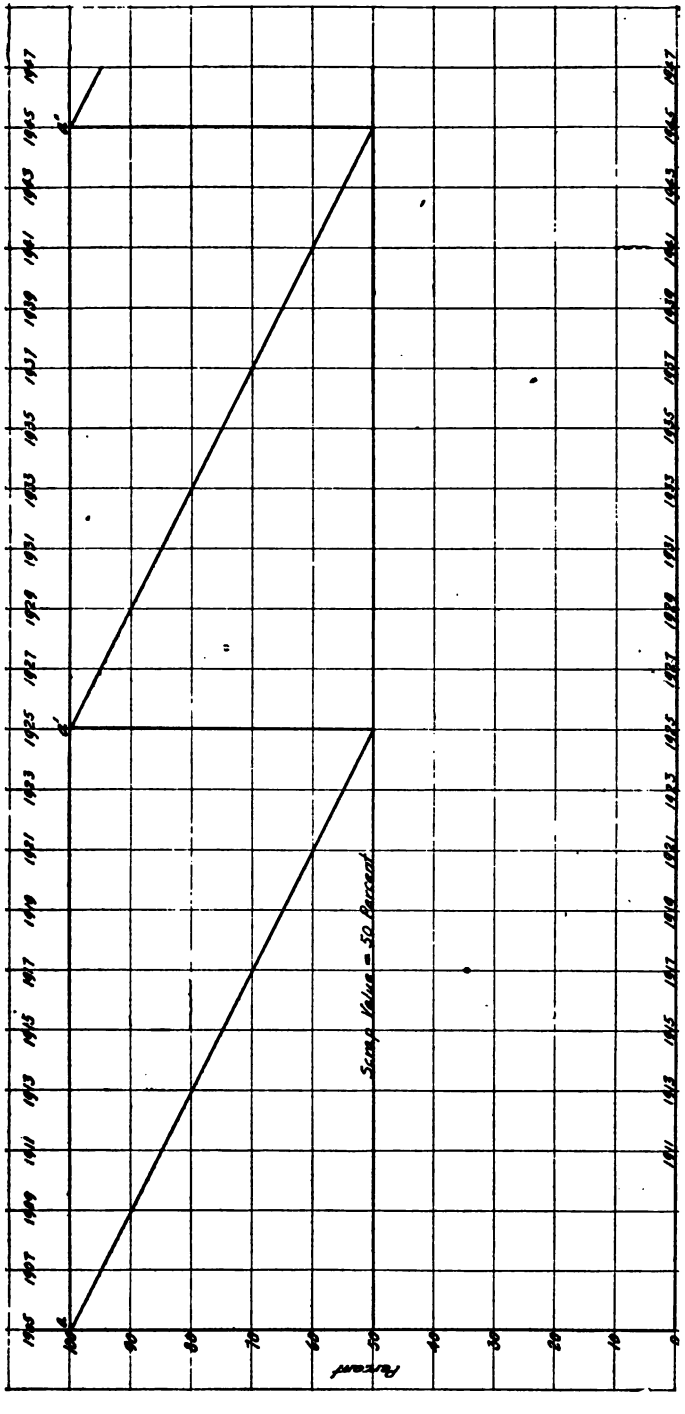

Figure 15.

Theoretical Value Curve. Electric Cable.
United Railway Co., St. Louis.
0.6% of Total.
All installed at practically same period.

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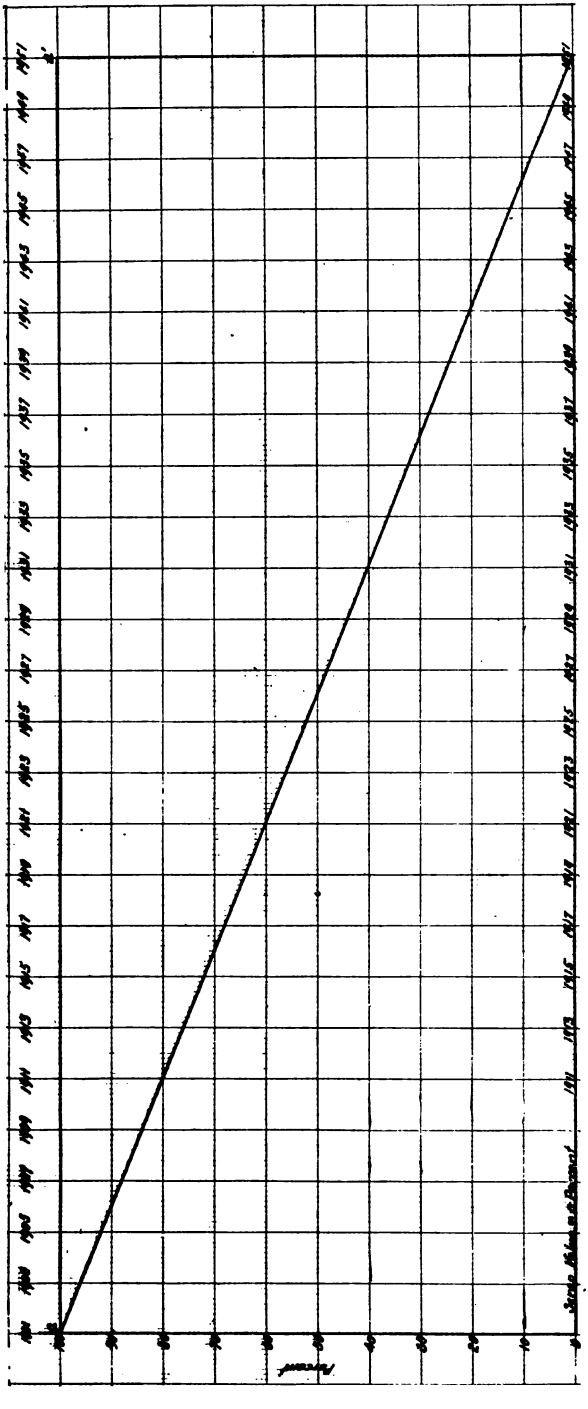

Figure 16.
Theotrical Value Curve. Conduits.
United Railway Co., St. Louis.
0.1% of Total.
All installed at practically same period.

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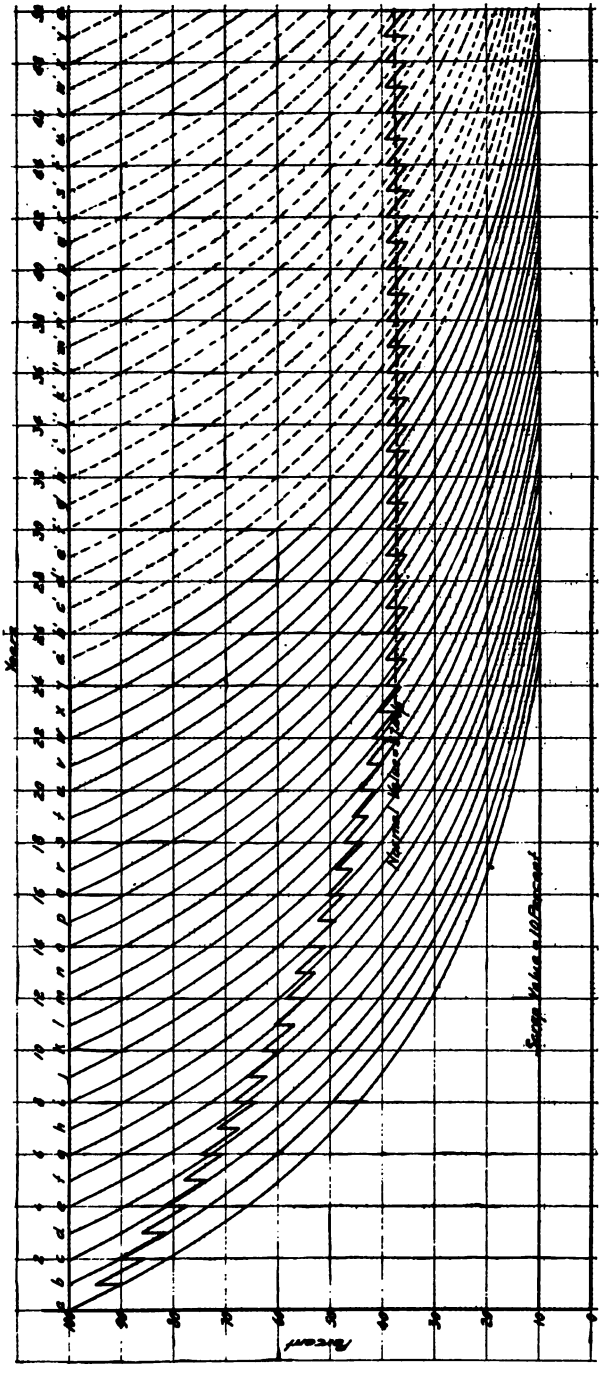

Figure 17.

Ideal Value Curve on 20 even annual installations. Diminishing Value Method. 10%.

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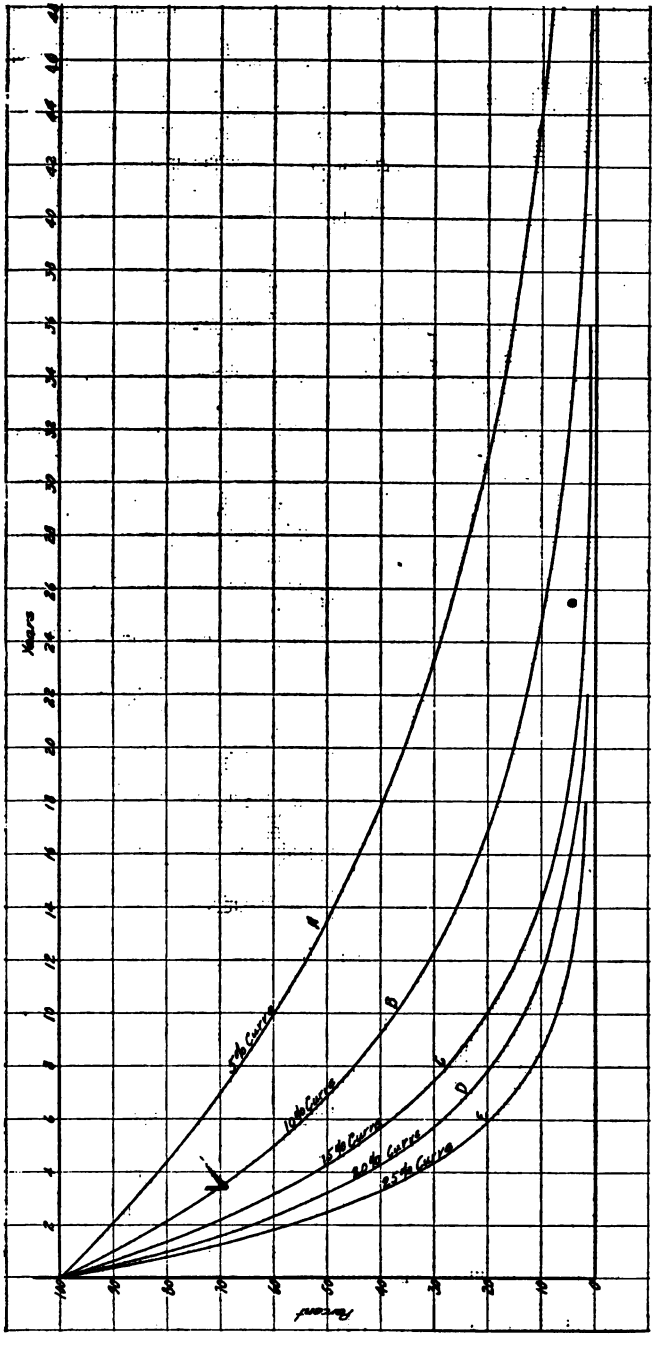

Figure 18.
"Diminishing Value" Method of Depreciation.

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